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Health Information Technology

An Assessment of Maryland Hospitals

October 2014

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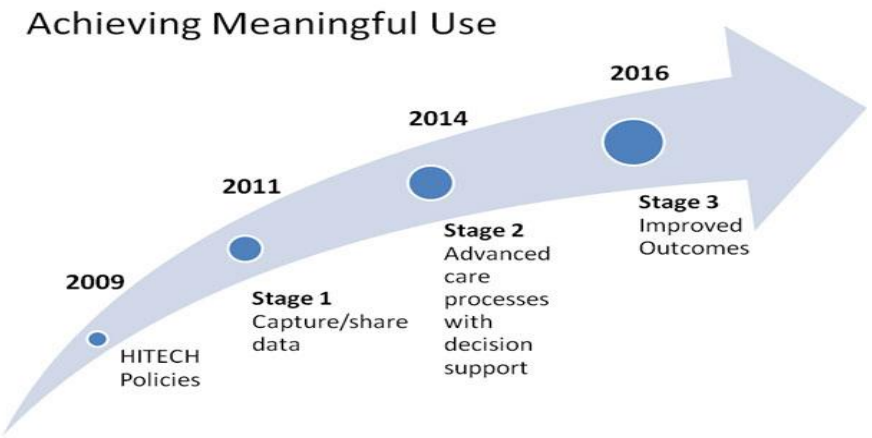
INTRODUCTION

Overview

Widespread adoption and effective use of health information technology (health IT) is considered critical infrastructure needed to achieve health care reform goals, which include improving patient outcomes, enhancing population health management, and containing costs.[1, 2, 3] Broadly defined, health IT refers to hardware and software, including electronic information systems, used to create, store, transmit, receive and analyze health information. Among other things, health IT helps to promote adherence to clinical care guidelines, enhance disease surveillance, and decrease medication errors.[4] Over the last several years, the enactment of two federal laws have sparked an increased investment in the adoption and implementation of health IT: the Health Information Technology for Economic and Clinical Health (HITECH) Act, a provision of the American Recovery and Reinvestment Act of 2009 (ARRA);[5] and the Patient Protection and Affordable Care Act (PPACA).[6, 7] The HITECH Act aims to advance the use of health IT, specifically the adoption and meaningful use (MU) of electronic health records (EHRs) through the Centers for Medicare & Medicaid Services (CMS) EHR Incentive Programs.[8] There are three stages of MU which evolve over a five year period and focus on the following: Stage 1 (2011-2014) data capture and sharing; Stage 2 (2014-2016) advance clinical processes; and Stage 3 (2016 and beyond) improved outcomes.[9]



Health IT diffusion is a phased approach, beginning with adoption of a technology and subsequently implementing advanced features of the technology. EHR adoption locally and nationally is nearing 100 percent.[10] While EHR adoption is widespread, the use of advanced features lags. Over the next several years, hospitals will increasingly rely on technology to support health care delivery reform. Capturing health information electronically in EHR systems can enable health care practitioners across various care settings to exchange patient information.[11]

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[1] Institute of Medicine, *Health IT and Patient Safety: Building Safer Systems for Better Care,* 2012. Washington, DC: The National Academies Press.
[2] Annals of Internal Medicine, *Health Information Technology: An Updated Systematic Review With a Focus on Meaningful Use*, January 2014. Available at: annals.org/article.aspx?articleid=1811028.
[3] CMS, *Lower Costs, Better Care: Reforming Our Health Care Delivery System*, February 2013. Available at: www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-Sheets/2013-Fact-Sheets-Items/2013-02-28.html.
[4] The Office of the National Coordinator for Health Information Technology (ONC), *Basics of Health IT*, Accessed August 2014. Available at: www.healthit.gov/patients-families/basics-health-it.
[5] American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115, 516 (Feb. 19, 2009).
[6] Patient Protection and Affordable Care Act, Pub. L. No. 111-148 (Mar. 2010).
[7] Harvard School of Public Health, *Health Information Technology in the United States: Better Information Systems for Better Care*, 2013. Available at: www.rwjf.org/content/dam/farm/reports/reports/2013/rwjf406758.
[8] The EHR Incentive Programs offer financial incentives to eligible providers, eligible hospitals, or critical access hopsitals as they adopt and implement certified EHR technology. There are three stages of MU that include a series of measures that must be met in order to qualify for an incentive payment. For more information, visit: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Getting_Started.html.
[9] HealthIT.gov, *Meaningful Use Definition & Objectives*, Accessed August 2014. Available at: www.healthit.gov/providers-professionals/meaningful-use-definition-objectives.
[10] Maryland hospital EHR adoption is 96 percent; national hospital EHR adoption is 94 percent.
[11] Journal of the American Medical Informatics Association, *Electronic health record functionality needed to better support primary care,* January 2014. Available at: jamia.bmj.com/content/early/2014/01/15/amiajnl-2013-002229.full.pdf?keytype=ref&ijkey=QIFhB11W2XCMaQD.

About the Assessment

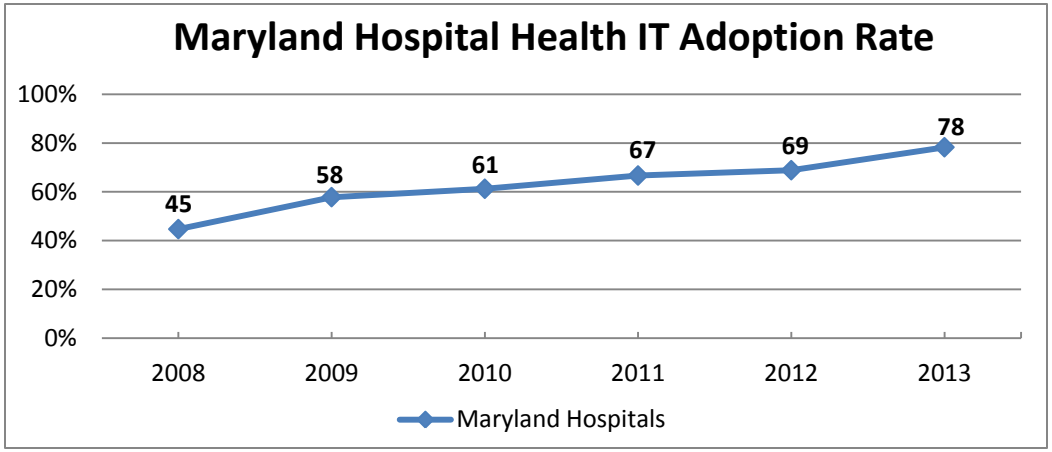
This report illustrates the progress made by all 46 general acute care hospitals (hospitals) in Maryland regarding their adoption of health IT between 2008 through 2013. Since 2008, the assessment has expanded to evaluate additional technologies being utilized by hospitals as well as hospital participation in the EHR incentive programs. The assessment benchmarks hospital health IT adoption in Maryland against national trends. The ability to evaluate the State's progress to national activity provides valuable insight regarding how well Maryland compares with the nation. Surveys were sent to Chief Information Officers (CIOs) requesting information about hospital adoption and use of EHRs, computerized physician order entry (CPOE), electronic prescribing (e-prescribing), electronic medication administration records (eMAR), bar code medication administration (BCMA), infection surveillance software (ISS), clinical decision support (CDS), patient portals, telemedicine and utilization of the State-Designated Health Information Exchange (HIE), the Chesapeake Regional Information System for our Patients (CRISP).[12, 13] For those hospitals that had not yet adopted a specific technology, CIOs identified their plans to implement the technology. The assessment also highlights hospital participation in MU.[14, 15]

Limitations

The data gathered for this assessment was self-reported by hospital CIOs through calendar year 2013. Responses may have been influenced by CIOs perception of the questions. National benchmark data does not exist for all components of technology assessed in Maryland. Comparisons between Maryland hospital adoption rates to national adoption rates differ due to: 1) national data used for comparison purposes are not census level data; and 2) a single comparison survey of national performance does not exist; multiple surveys were used in the evaluation of national performance levels.

Summary of Hospitals Health IT Adoption Over Time

Since 2008, the hospital health IT adoption rate[16] in Maryland has increased each year. This increase is generally attributed to hospitals' efforts to improve care delivery through achieving the goals of health care reform.



[12] CIOs reported how many departments used each technology, which was used to determine the percentage of health IT diffusion within each hospital in 2013.
[13] Adoption of CRISP includes the status of hospitals data submission to CRISP and adoption of CRISP services.
[14] All survey questions pertaining to hospitals' participation in MU was verified against MU program data obtained by the Department of Health and Mental Hygiene.
[15] Refer to Appendix A for a listing of the 2013 survey questions.
[16] The hospital health IT adoption rate is determined based on hospitals adoption of EHRs, CPOE, e-prescribing with community pharmacies, eMAR, BCMA, and ISS.

Hospital Health IT Adoption in Maryland and Nationally

Technology	Maryland Hospitals							Hospitals Nationally[17]
	2008 # N=44	2009 # N=47	2010 # N=46	2011 # N=46	2012 # N=46	2013 # N=46	2013 %	%
EHRs[18]	34	38	41	41	41	44	96	94
CPOE	24	32	36	38	39	43	93	86
E-Prescribing[19]								
• *Externally*	4	10	9	17	10[20]	21	46	63
• *Internally*	-	-	-	-	-	22	48	-
eMAR	24	37	37	40	42	45	98	60
BCMA	14	27	29	32	36	40	87	50
ISS	18	19	17	16	22[21]	22	48	20-25
CDS[22]	17	28	33	38	40	43	93	93
Patient Portal	-	-	-	-	12[23]	23	50	50
CRISP Data Submission								
• *Admission/Discharge/Transfer Data*	-	-	5	44	46	46	100	-
• *Laboratory Report*	-	-	0	14	30	31	67	57
• *Radiology Reports*	-	-	0	18	32	35	76	55
• *Transcribed Reports*	-	-	0	9	31	33	72	42
CRISP Services								
• *CRISP Query Portal*	-	-	-	8	28	42	91	-
• *Prescription Drug Monitoring Program*	-	-	-	-	2	36	78	-
Telehealth	-	-	-	25	21[24]	28	61	42
MU Attestation	-	-	-	-	25	42	91	85
MU Incentive Payments[25]	-	-	-	-	38	43	93	86

Note: "N" indicates the total number of hospitals during the reporting period; strikethroughs (-) indicate health IT that was not assessed during the reporting period or national comparison data that is unavailable.

[17] Refer to the following *Hospital Health IT Adoption* section of this report for national data sources.

[18] 2013 percentages reflect hospitals in Maryland and nationally using a certified EHR in accordance with ONC Standards & Certification Criteria (S&CC). ONC S&CC establishes required capabilities and related standards and implementation specifications needed for certified EHR technology to support the achievement of MU. For more information, visit: www.healthit.gov/policy-researchers-implementers/standards-certifications-criteria-final-rule.

[19] Historically, the assessment inquired about hospital use of e-prescribing externally (i.e. discharge medications sent to community pharmacies). To enable better national comparisons, the 2013 assessment added a question about hospital use of e-prescribing internally (i.e. medications sent directly to the hospital's pharmacy to administer to patients in the hospital).

[20] Fluctuation in adoption from year to year was largely attributed to survey respondents' perception of the definition of e-prescribing.

[21] Total number of hospitals that adopted ISS in 2012 was changed from 24 to 22 after follow-up with hospital respondents.

[22] In 2012, CDS survey questions were modified to capture use of CDS consistent with MU requirements to enable a national comparison.

[23] Total number of hospitals that adopted a patient portal in 2012 was changed from 14 to 12 after follow-up with hospital respondents.

[24] Fluctuation from 2011 to 2012 was largely attributed to hospitals that had implemented telehealth pilot projects in 2011 that ended in 2012.

[25] The percent of eligible hospitals that have received an EHR incentive payment for adopting, implementing, or upgrading to certified EHR technology and/or attesting to MU.

HEALTH IT DIFFUSION & PLANNING

Hospital health IT implementation is an evolving process; adoption and use of health IT is a complex and costly endeavor, which requires evaluating and modifying clinical workflow processes. Depending on a hospital's clinical workflow processes, it may not be necessary to implement certain technology features in every hospital department. Hospitals are at various phases of diffusing health IT and implementing additional features of technologies.

To assess health IT diffusion within each hospital, CIOs indicated how many departments use EHRs, CPOE, e-prescribing, eMAR, BCMA, ISS, patient portal, and telehealth (technology). CIOs specified future plans to implement the technology if it had not yet been adopted. The majority of Maryland hospitals reported implementing EHRs in all hospital departments.[26] Widespread diffusion of EHRs within hospitals can be attributed to hospitals meeting MU requirements. Hospital planning activities include expansion of patient portals, e-prescribing, and ISS. Several hospitals indicated they remain undecided about an adoption strategy for e-prescribing to the hospital pharmacy (internal), telehealth, and ISS.

Maryland Hospital Health IT Implementation Status and Adoption Plans

Technology	% of Hospital Departments[27]				Planning			
	100%	76-99%	51-75%	<50%	To Be Implemented in 2014	To Be Implemented in Two years or Beyond	Assessing Technology in 2014	Undecided about Adopting Technology
	# of Hospitals				*# of Hospitals*			
EHRs	30	7	3	4	2	0	0	0
CPOE[28]	26	5	6	6	2	1	0	0
e-Prescribing								
External	6	2	3	10	17	5	3	0
Internal	6	6	4	6	5	3	1	15
eMAR	13	10	7	15	1	0	0	0
BCMA	9	6	9	16	3	3	0	0
ISS[29]	-	-	-	-	9	3	5	7
Patient Portal[30]	-	-	-	-	21	0	2	0
Telehealth[31]	Refer to Appendix B				1	2	4	11

Note: Strikethroughs (-) represent those technologies in which hospitals were not asked to report on the total number of departments using the specified technology.

[26] Refer to Appendix B for a detailed listing of health IT diffusion by hospital.
[27] Ranges were selected to illustrate variation of health IT diffusion among hospitals.
[28] CDS functionality was included in the CPOE section of the survey.
[29] A total of 22 hospitals reported the adoption of ISS.
[30] A total of 23 hospitals reported the adoption of patient portal technology.
[31] A total of 28 hospitals reported the adoption of telehealth capabilities.

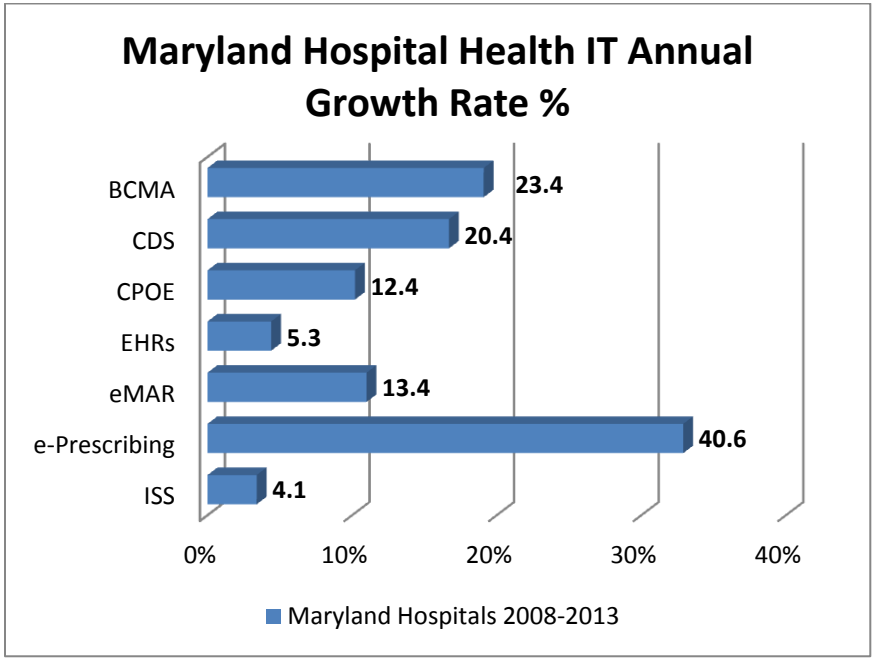
HEALTH IT GROWTH

Market Drivers

In addition to HITECH and PPACA, several reasons exist for the national and local increase in hospital health IT adoption. In Maryland, the increase in hospital health IT adoption is generally attributed to hospital participation in the EHR incentive programs. The American Hospital Association notes that nationally, hospitals are gradually evaluating and adopting more innovative health IT solutions – such as data analytic tools – with the aim to achieve high quality health care that decreases costs, minimizes health complications, reduces duplicative or unnecessary tests, and lowers the risk of harm to patients.[32] Health IT solutions will become increasingly important as care delivery transitions from a fee-for-service model to value-based care delivery.[33] Value-based care delivery models include: integrating health care systems, enhancing care management for an aging population and other chronic conditions, reducing medication errors, and taking part in government initiatives.[34]

Maryland Progress

To assess technology growth, the annual growth rate[35] was calculated for the following: BCMA, CDS, CPOE, EHRs, eMAR, e-prescribing, and ISS. The growth rate was calculated between 2008 and 2013.[36] Prior to HITECH, hospital adoption of e-prescribing was minimal; the higher annual growth rate for e-prescribing is attributed to hospitals achieving the goals of MU. Hospital health IT adoption is expected to increase, as they increase diffusion and expand use of advanced functionalities. Expanded functionality is required to support data analytics, to better identify at-risk patients and improve population health management.



[32] American Hospital Association, *Adopting Technological Innovation in Hospitals: Who Pays and Who Benefits?*, 2006. Available at: www.aha.org/content/00-10/061031-adoptinghit.pdf.

[33] The terminology that refers to value-based models of care delivery is continuously changing and slightly varies. The terminology includes: health care reform initiatives; integrated models of care delivery; innovative care delivery models; pay-for-performance; capitated; population-based payments; and bundled payments. Under these models, health care providers are given incentives to consider the cost of treatment and improve patient outcomes. Examples of the models include accountable care organizations (ACOs) and patient centered medical home programs (PCMHs).

[34] Healthcare IT News, *Big growth forecast for health IT market, December 2013*. Available at: www.healthcareitnews.com/news/big-growth-forecast-health-it-market.

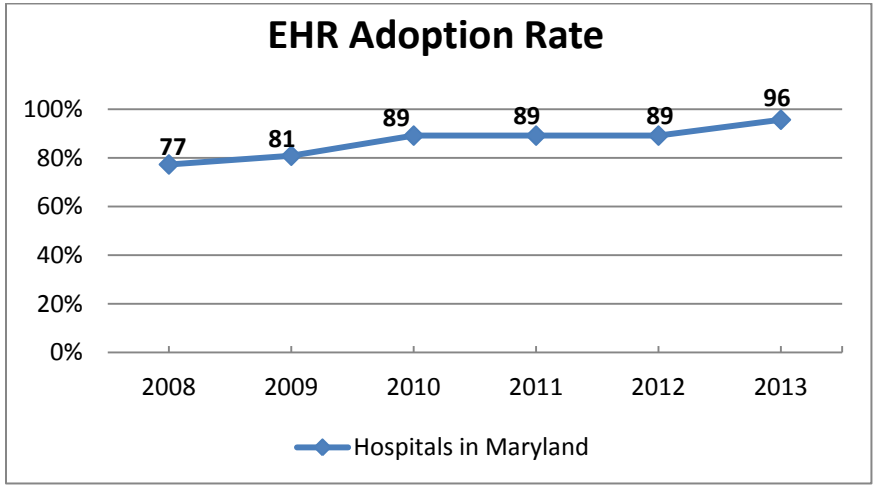
[35] The compound annual growth rate is a measure of growth over multiple periods.

[36] Refer to Appendix C.

HOSPITAL HEALTH IT ADOPTION

Electronic Health Records

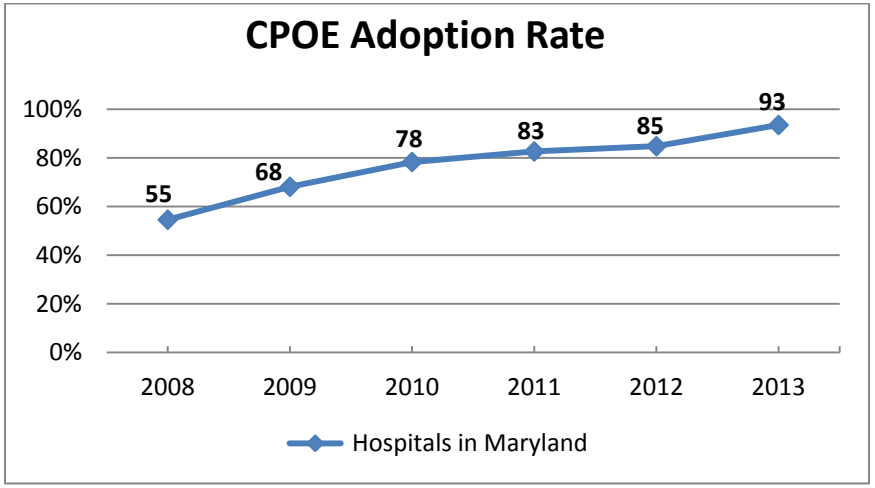
EHRs make clinical information available electronically. EHRs contain medical histories of patients and offer evidence based tools to assist in the clinical decision-making process. When used effectively, EHRs can lead to better coordinated and patient-centered care.[37]



- EHR adoption in Maryland is about equal to the 94 percent of hospitals nationally that have adopted a certified EHR[38, 39]
- The two hospitals that had not adopted an EHR in 2013 indicated plans to implement EHRs prior to the end of 2014
- 65 percent, or 30 hospitals, have implemented EHRs in all hospital departments

Computerized Physician Order Entry

CPOE allows providers to electronically generate orders, such as medications, tests, and other procedures, from a computer or mobile device. CPOE helps to ensure that orders are legible and complete prior to being filled and/or administered.[40]



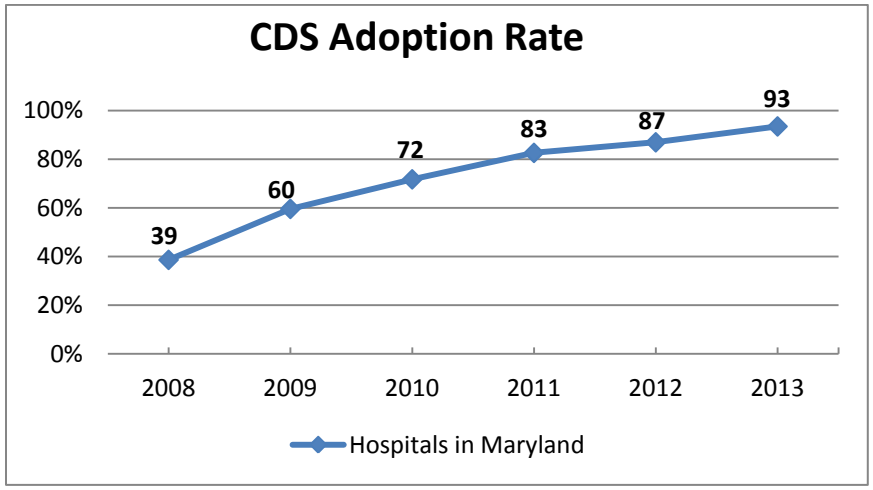
- 91 percent of hospitals report use of CPOE for medication orders, as compared to 86 percent of hospitals nationally[41, 42]
- 60 percent of hospitals, or 26 out of the 43 that have adopted CPOE, have implemented the technology in all hospital departments
- Three hospitals have not yet adopted CPOE: two hospitals indicated plans to implement CPOE in 2014 while one hospital indicated plans to implement CPOE within two years

[37] HealthIT.gov, *What is an electronic health record (EHR)?* Accessed August 2014. Available at: healthit.gov/providers-professionals/faqs/what-electronic-health-record-ehr.
[38] ONC, *Adoption of EHR Systems among U.S. Non-federal Acute Care Hospitals: 2008-2013*, Data Brief No. 16, May 2014.
[39] Historically, this assessment has measured basic EHR adoption, which includes a base set of EHR functionalities. Certified EHR technology, which meets federal criteria and standards, first became available in 2011 as required by MU.

[40] U.S. Department of Health & Human Services (HHS), AHRQ, *Computerized Provider Order Entry*, October 2012. Available at: psnet.ahrq.gov/primer.aspx?primerID=6.
[41] ONC, *U.S. Hospital Adoption of Computerized Capabilities to Meet Meaningful Use Stage 1 Objectives 2011-2013*, Health IT Quick Stat, No. 22, April 2014.
[42] Refer to Appendix D for a listing of the various types of orders, such as laboratory and radiology services, entered electronically by hospitals in 2013.

Clinical Decision Support

CDS is designed to aid the clinical decision-making process at the point of care to help prevent adverse events. CDS encompasses tools such as drug-drug interaction checks, drug-allergy interaction checks, basic dosing guidance, clinical guidelines, patient specific reports, and alerts/reminders to providers.[43]



- 93 percent, or 43 hospitals, have adopted drug-drug interaction checks and drug-allergy interaction checks as required by MU Stage 2, which aligns with the 93 percent of hospitals nationally that report use of these same CDS features[44, 45]
- 89 percent of hospitals use basic dosing guidance, an increase of five hospitals since 2012[46]

[43] HealthIT.gov, *Clinical Decision Support*, Accessed August 2014. Available at: www.healthit.gov/policy-researchers-implementers/clinical-decision-support-cds.

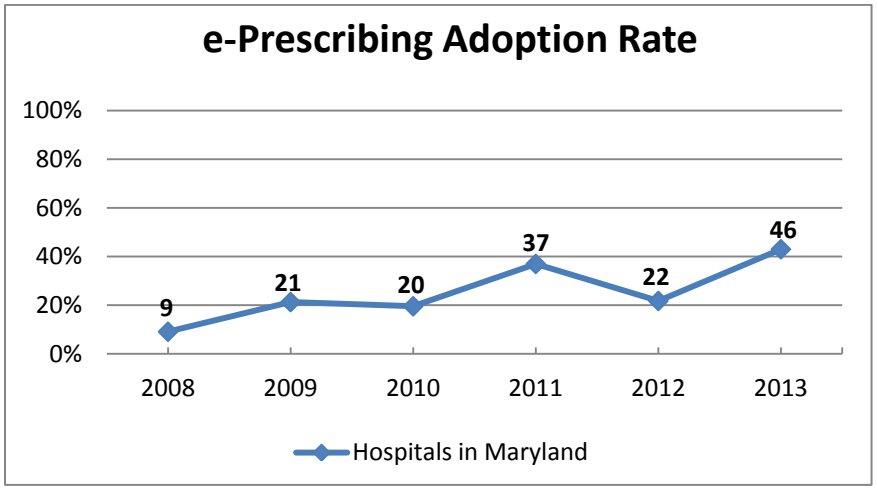
[44] MU Stage 2 also requires EHs to choose five CDS interventions to implement, such as basic dosing guidance, that are related to four or more clinical quality measures. For more information, visit: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2_HospitalCore_5_ClinicalDecisionSupport.pdf.

[45] ONC, *U.S. Hospital Adoption of Computerized Capabilities to Meet Meaningful Use Stage 1 Objectives 2011-2013*, Health IT Quick-Stat, No. 22, April 2014.

[46] Refer to Appendix D for a listing of all CDS functionalities used by hospitals in Maryland in 2013.

Electronic Prescribing

e-Prescribing is the electronic generation, transmission, and filing of a prescription. e-Prescribing systems can include CDS as well as information on patient eligibility, formulary, and medication history.[47] Two forms of e-prescribing exist: 1) to an internal hospital pharmacy; and 2) to an external pharmacy for discharge medications.



Note: Percentages reflect external e-prescribing; historical fluctuations in adoption were largely due to hospitals perception of the definition of e-prescribing.

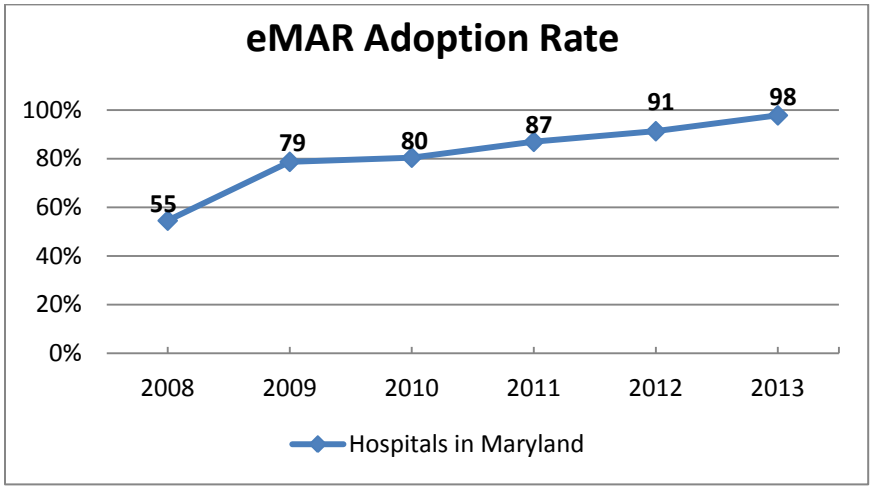
- e-Prescribing nationally exceeds Maryland, with 63 percent reporting use of external e-prescribing[48]
- 28 percent of hospitals e-prescribe both internally and externally
- 17 hospitals indicated plans to implement external e-prescribing prior to the end of 2014; 15 hospitals are undecided about implementing internal e-prescribing

[47] HHS, Health Resources and Services Administration (HRSA), *What is electronic prescribing?*, Accessed August 2014. Available at: www.hrsa.gov/healthit/toolbox/healthitadoptiontoolbox/electronicprescribing/elecprescribing.html.

[48] ONC, *U.S. Hospital Adoption of Computerized Capabilities to Meet Meaningful Use Stage 2 Objectives*, Health IT Quick-Stat, No. 23, April 2014.

Electronic Medication Administration Records

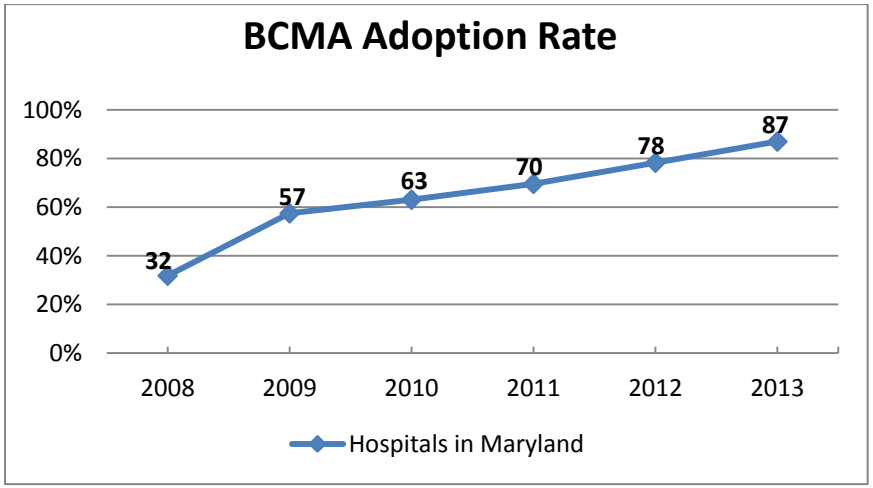
eMAR is a record of medication administered to a patient by a health care practitioner. eMAR helps improve the tracking and monitoring of patients' medications and can prevent lost or misinterpreted records.[49]



- An additional three hospitals adopted eMAR since 2012;[50] eMAR adoption in Maryland surpasses the 60 percent of hospitals nationally that have adopted eMAR[51]
- While eMAR adoption is high, only 13 of the 45 hospitals, or 29 percent, have implemented the technology in all hospital departments
- The one hospital that had not adopted eMAR indicated plans to implement the technology in 2014

Bar Code Medication Administration

BCMA uses a barcode identification scanning device to provide verification of the correct patient and medication at the point-of-care. Coupled with eMAR, BCMA can reduce medication errors that occur at the dispensing, transcription, and administration stages of prescribing medications.[52]



- An additional four hospitals adopted BCMA since 2012;[53] BCMA adoption in Maryland exceeds the 50 percent of hospitals nationally that use BCMA[54]
- Nine of the 40 hospitals, or 23 percent, have implemented BCMA in all hospital departments
- Six hospitals have not adopted BCMA: three hospitals indicated plans to implement BCMA technology by the end of 2014, while the remaining three hospitals indicated that plans exist to implement BCMA in the future

[49] American Hospital Association, *Critical Access Hospitals and Meaningful Use of Health Information Technology,* February 2010. Available at: www.aha.org/content/00-10/CAHandMngflUse-FLEX-10Feb.pdf.

[50] MU Stage 2 requires hospitals to use eMARs for more than 10 percent of medication orders. For more information, visit: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2_HospitalCore_16_ElectronicMedicationAdminRec_eMAR.pdf.

[51] Health Information and Management Systems Society Analytics, *The State of U.S. Hospitals Relative to Achieving Meaningful Use Measurements*, 2009. Available at: www.himssanalytics.org/docs/HA_ARRA_100509.pdf.

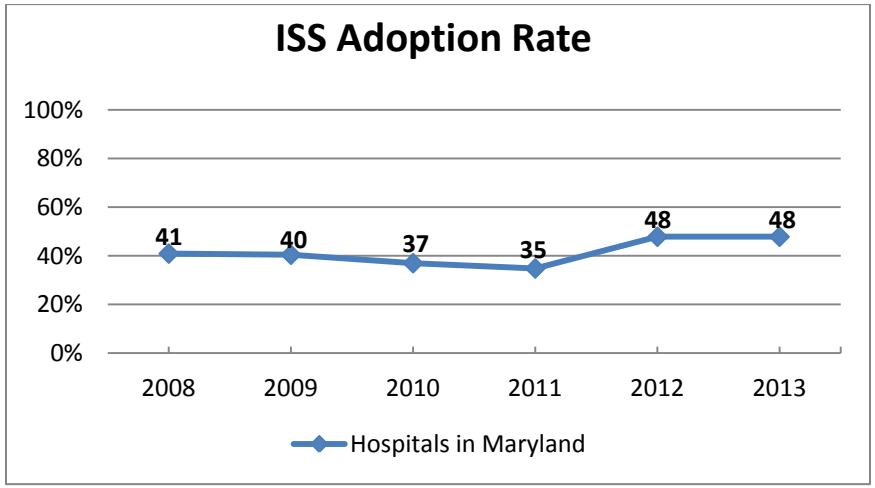
[52] AHRQ, *The Role of Bar Coding and Smart Pumps in Safety*, September 2008. Available at: webmm.ahrq.gov/perspective.aspx?perspectiveID=64.

[53] MU Stage 2 requires hospitals to use assistive technologies, such as BCMA, in conjunction with an eMAR to track the ordering and administration of medications.

[54] America's Pharmacist, *Getting up to Code, America's Pharmacist*, January 2013. Available at: www.ncpaltc.org/pdfs/APJAN13-Getting_Up_to_Code.pdf.

Infections Surveillance Software

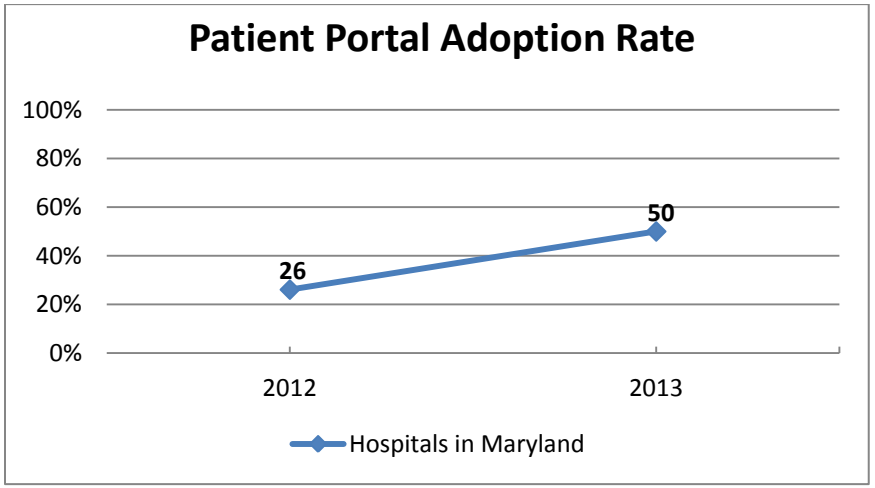
ISS uses EHR data to issue alerts regarding potential hospital infections.[55] Alerts can enable health care practitioners to better detect, manage, and control infections in the hospital, identify potential root causes, and prevent future occurrences.[56]



- Uptake of ISS remains low in Maryland;[57] adoption is even lower nationally with only 20-25 percent of hospitals reporting use of ISS;[58] currently, ISS is not required as part of MU
- Nine hospitals noted plans to implement ISS in 2014; the All-Payor Model in Maryland requires hospitals to reduce infections by 30 percent over the next five years, and may spur an increase in hospitals adoption of ISS[59, 60]

Patient Portals

A patient portal is a secure website that patients can use to access their health information from an EHR (e.g. medications, immunizations, lab results, etc.). Patients may also securely e-mail their health care practitioners, schedule appointments, or view educational materials.[61]



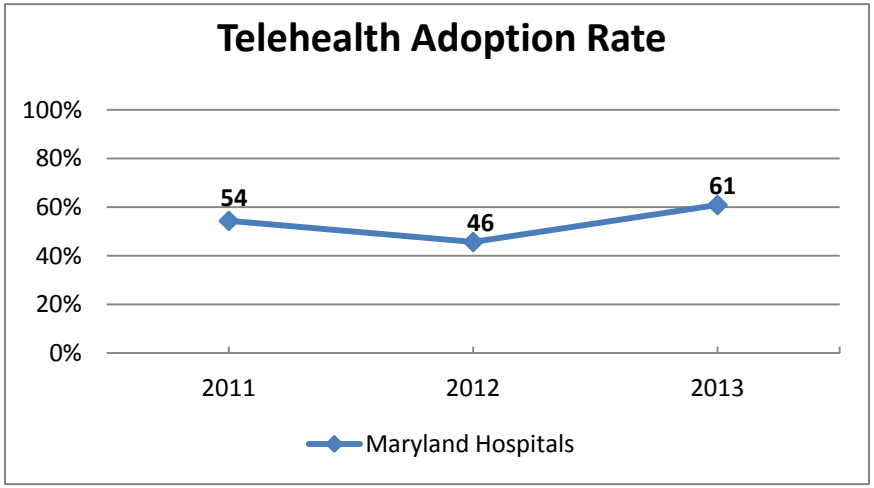
Note: Data collection for patient portal adoption began in 2012

- Patient portal adoption is about half, even though MU Stage 2 requires hospitals to provide patients with the ability to view, download, and transmit (VDT) their health information online;[62] use of patient portals in Maryland is equal nationally at 50 percent[63]
- 21 hospitals indicated plans to implement a patient portal by the end of 2014; this increase is attributed to preparation by hospitals to meet the VDT requirement if they plan to attest for MU Stage 2 beginning in 2014

[55] The Centers for Disease Control and Prevention indicates about one out of every 20 patients gets an infection when hospitalized: www.cdc.gov/hai/burden.html.
[56] University of Texas, South Texas Veterans Healthcare, System and Columbia University School of Nursing, *Electronic Surveillance Systems in Infection Prevention*, 2012. Available at: www.cumc.columbia.edu/studies/pnice/chaipi/documents/ESS%20paper%20in%20press.pdf.
[57] Medicare does not pay for treatments associated with a hospital acquired infection.
[58] KLAS, *Infection Control 2011: Better Tools + More Data = Less Infection?* June 2011. Available at: www.klasresearch.com/news/pressroom/2011/InfectionControl.
[59] The All-Payor Model was approved by CMS on January 10, 2014 with the central goals being to enhance patient care, improve health outcomes, and lower costs. For more information, visit: www.hscrc.maryland.gov/hscrc-stakeholders.cfm.
[60] Baltimore Business Journal, *Maryland hospitals must reduce patient infections, injuries or face revenue hit*, March 2014. Available at: www.bizjournals.com/baltimore/news/2014/03/11/maryland-hospitals-must-reduce-patient-infections.html?page=all.
[61] HealthIT.gov, healthit.gov/providers-professionals/faqs/what-patient-portal.
[62] Health IT.gov, *Step 5: Achieve Meaningful Use Stage 2*, Accessed August 2014. Available at: www.healthit.gov/providers-professionals/achieve-meaningful-use/core-measures-2/patient-ability-electronically-view-download-transmit-vdt-health-information.
[63] Frost & Sullivan, *Market Disruption Imminent as Hospitals and Physicians Aggressively Adopt Patient Portal Technology*, September 2013. Available at: www.frost.com/prod/servlet/press-release.pag?docid=285477570.

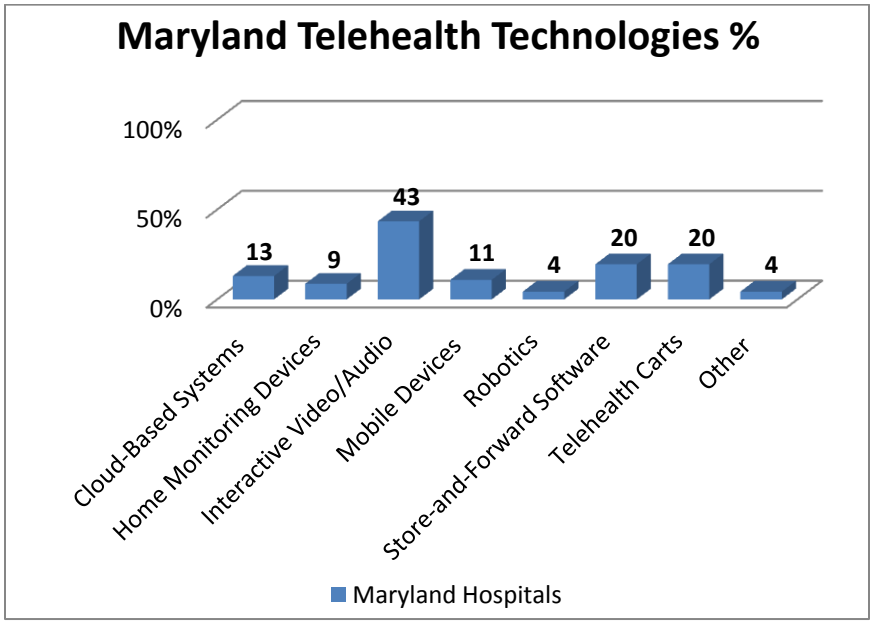
Telehealth

Telehealth[64] is the delivery of health education and services using telecommunications and related technologies in coordination with health care practitioners. Telehealth can increase access to care and improve patient and provider satisfaction.[65]



Note: Fluctuation in 2012 was largely attributed to hospitals that had implemented grant-funded telehealth pilot projects in 2011 that ended in 2012. Data collection for telehealth adoption began in 2011.

- Seven hospitals reported adopting telehealth in 2013; adoption of telehealth by hospitals nationally is 42 percent[66]
- Four hospitals indicated plans to implement telehealth by the end 2014, three hospitals indicated plans to implement telehealth within the next few years; 11 hospitals are undecided about adopting telehealth
- Eight of the 28 hospitals that have adopted telehealth report both internal (e.g., specialist consultations within the hospital) and external (e.g., radiology report readings) use of telehealth
- Remote monitoring and teleradiology were the most frequently reported telehealth services offered by hospitals
- The most frequently reported use of telehealth technology is interactive audio/video technology; this corresponds to Maryland law that specifies use of audio/video technology for reimbursement[67]



Note: Other technologies include intra-operative neurophysiological monitors or electronic ICU program software that assists with physician or nurse shortages.

[64] The term *telehealth* encompasses both clinical and non-clinical services delivered remotely whereas the term *telemedicine* is restricted to clinical services only. Refer to Appendix C for more information about hospital telehealth services and technologies.
[65] The Information Technology and Innovation Foundation, *Unlocking the Potential of Physician-to-Patient Telehealth Services,* May 2014. Available at: www2.itif.org/2014-unlocking-potential-physician-patient-telehealth.pdf.
[66] Health Affairs, *Telehealth Among US Hospitals: Several Factors, Including State Reimbursement And Licensure Policies*, Influence Adoption, February 2014. Available at: content.healthaffairs.org/content/33/2/207.abstract.

[67] As defined in Maryland law, Md. Code Ann., Insurance § 15–139, telemedicine means, as it relates to the delivery of health care services, the use of interactive audio, video, or other telecommunications or electronic technology by a licensed health care provider to deliver a health care service within the scope of practice of the health care provider at a site other than the site at which the patient is located. *Telemedicine* does not include: (i) an audio-only telephone conversation between a health care provider and a patient; (ii) an electronic mail message between a health care provider and a patient; or (iii) a facsimile transmission between a health care provider and a patient..

Health Information Exchange

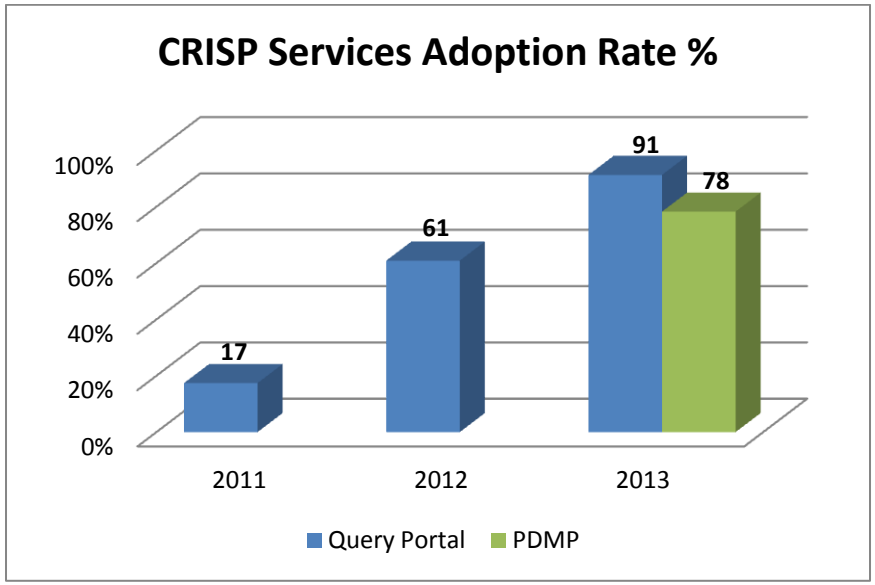
An HIE allows health care practitioners to appropriately access and securely share patients' medical information electronically across disparate health care systems.[68] All 46 Maryland hospitals participate[69] with CRISP, the MHCC designated statewide HIE, compared to 57 percent of hospitals nationally that report participation in an HIE.[70] In addition to hospitals, other CRISP data contributors include nine long-term care facilities, eight radiology facilities, and two laboratories. Additionally, CRISP recently expanded connectivity to certain hospitals and providers in the District of Columbia and Delaware.[71]

Accelerating the electronic exchange of health information supports new service delivery and payment models that encourage greater coordination and patient-centered care.[72] The value of the data available through CRISP will increase as ambulatory practices begin to contribute data. CRISP is assesing ambulatory connectivity strategies to enhance its ability to facilitate population health activities.

Since 2011, hospitals have been submitting admission, discharge, and transfer (ADT) data to CRISP; more than 50 percent of hospitals also submit laboratory and radiology reports as well as transcribed documents (i.e., clinical summaries). CRISP enables the availability of such clinical information to its participating organizations through a variety of HIE services.[73] Two of these services utilized by hospitals include the following:

- *Query Portal*: Introduced in 2011, the Query Portal allows health care practitioners the ability to query, via a web-based application, available information such as patient demographics, laboratory results, radiology reports, discharge summaries, operative and consult notes, and prescription drug fill history.
- *Prescription Drug Monitoring Program (PDMP)*: Introduced in 2013, the PDMP aims to reduce abuse and diversion of prescription drugs in Maryland for non-medical purposes. The PDMP collects and securely stores information on drugs that contain controlled dangerous substances and are dispensed to patients in Maryland. CRISP makes the PDMP information available through its Query Portal.

Twelve hospitals adopted the Query Portal in 2013 as CRISP continues to increase data sources and hospitals incorporate querying CRISP into their workflows.[74]



Note: The CRISP query portal became available in 2011 and the PDMP became available in 2013.

[68] HealthIT.gov, *Health Information Exchange*, Accessed August 2014. Available at: healthit.gov/HIE.
[69] All Maryland hospitals both send data to CRISP and consume data from CRISP.
[70] EHR Intelligence, *HIE participation gaining with hospitals but faxing persists,* September 2013. Available at: ehrintelligence.com/2013/09/24/hie-participation-gaining-with-hospitals-but-faxing-persists.
[71] CRISP, *Health Information Exchange Participants as of 8/4/2014*, crisphealth.org/FOR-PROVIDERS/Participating-Organizations.
[72] HealthIT.gov, *Accelerating Health Information Exchange*, Accessed August 2014. Available at: www.healthit.gov/policy-researchers-implementers/accelerating-health-information-exchange-hie.
[73] For more information about CRISP and CRISP HIE services, see Appendix E and/or visit: crisphealth.org.
[74] Refer to Appendix E for detailed information on each hospital regarding their data submission to CRISP and adoption of CRISP services.

EHR INCENTIVE PROGRAMS

Hospitals use the EHR incentive payments to implement EHRs. Two federal EHR Incentive Programs exist: the Medicare EHR Incentive Program and the Medicaid EHR Incentive Program.[75] Hospitals are eligible to qualify for incentive payments if they: 1) adopt/implement/upgrade (AIU) certified EHRs (Medicaid only) in the first year of participation; and/or 2) attest to meeting federally defined MU criteria using a certified EHR.[76] MU sets specific objectives[77] that hospitals must achieve in order to qualify for an incentive payment under the EHR Incentive Programs. The MU objectives require use of certified EHRs to:

- Improve quality, safety, efficiency, and reduce health disparities;
- Engage patients and their families;
- Improve care coordination and population and public health; and
- Maintain privacy and security of patients' electronic health information.[78]

Adopt/Implement/Upgrade

AIU is only available through the Medicaid EHR Incentive Program[79] and allows hospitals to receive an incentive payment prior to attesting to MU. The AIU option was initially implemented to help provide a safety net for financially stressed hospitals as they purchase and work towards fully implementing an EHR. AIU aims to provide hospitals with a short term solution to obtain the financial resources needed to implement an EHR. Fewer hospitals select the AIU option only; many seek to maximize their incentive payment and work towards achieving MU to obtain both a Medicare and Medicaid incentive payment (e.g., apply for AIU as well as attest to MU under Medicare).[80] Roughly nine percent of hospitals qualified for an incentive payment under AIU in 2013;[81] nationally, 24 percent of hospitals have qualified for an incentive payment under AIU.[82]

Meaningful Use

Approximately 91 percent of hospitals, an increase of 16 hospitals since 2012, attested to MU Stage 1, which is slightly higher than 85 percent of hospitals nationally that attested to MU in 2013.[83, 84] Hospitals are preparing for MU Stage 2, which places an increased emphasis on using health IT in real-time (or near to real-time), such as CDS during care delivery, to avoid errors and improve care. In addition, hospitals are required to electronically exchange information with patients and other health care practitioners.[85]

Incentive Payments

Nationally, roughly $25.1 billion in incentive payments have been distributed to eligible providers, hospitals, and critical access hospitals; about 60 percent of that amount, or $15 billion, has been paid to roughly

[75] Both EHR Incentive Programs are similar, but there are some differences amongst the two (e.g., state Medicaid agencies manage the Medicaid EHR Incentive Program). For more information visit: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html?redirect=/ehrincentiveprograms/.

[76] CMS provides information on how hospital incentive payments are calculated. For the Medicare incentive payment calculation, visit: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/MLN_TipSheet_MedicareHospitals.pdf; for the Medicaid incentive payment calculation: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/MLN_TipSheet_MedicaidHospitals.pdf.

[77] MU objectives consist of both core and menu objectives, which vary among EPs, EHs, and critical access hospitals for each of the three MU stages. For additional information, visit: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Meaningful_Use.html.

[78] HealthIT.gov, *Meaningful Use Definition & Objectives*, Accessed August 2014. Available at: www.healthit.gov/providers-professionals/meaningful-use-definition-objectives.

[79] Hospitals must have at least a 10 percent Medicaid patient population.

[80] American Journal of Managed Care (AJMC), *Early Results From the Hospital Electronic Health Record Incentive Programs*, July 2013. Available at: www.ajmc.com/publications/issue/2013/2013-1-vol19-n7/early-results-from-the-hospital-electronic-health-record-incentive-programs/1.

[81] Refer to Appendix F for detail on hospitals AIU submission to the Medicaid in 2013.

[82] AJMC, *Early Results From the Hospital Electronic Health Record Incentive Programs*, July 2013. Available at: www.ajmc.com/publications/issue/2013/2013-1-vol19-n7/early-results-from-the-hospital-electronic-health-record-incentive-programs/1.

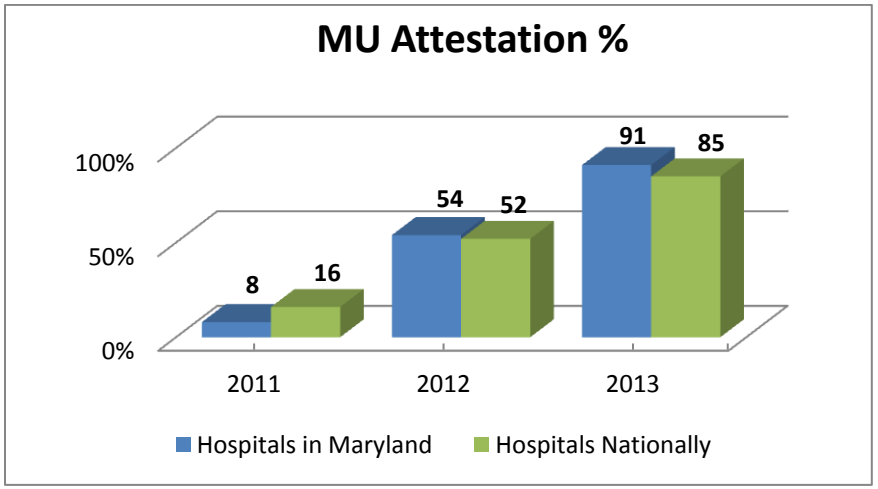
[83] Healthcare IT News, *Whopping $17B paid out so far for MU*, December 2013. Available at: www.healthcareitnews.com/news/whopping-17b-paid-out-so-far-mu.

[84] Refer to Appendix F for a detailed listing of hospitals MU achievements in meeting both core and menu objectives.

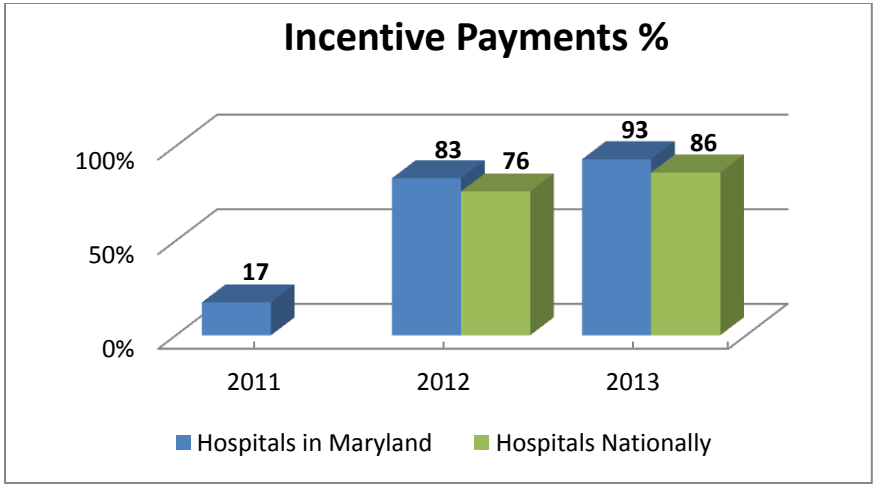
[85] Computer Sciences Corporation, *Meaningful Use For Hospitals The Top Ten Challenges*, 2013. Available at: assets1.csc.com/health_services/downloads/CSC_Meaningful_Use_for_Hospitals_The_Top_Ten_Challenges.pdf.

4,744 hospitals nationally.[86] As of July 2014, Maryland hospitals had received over $208 million in incentive payments.[87]

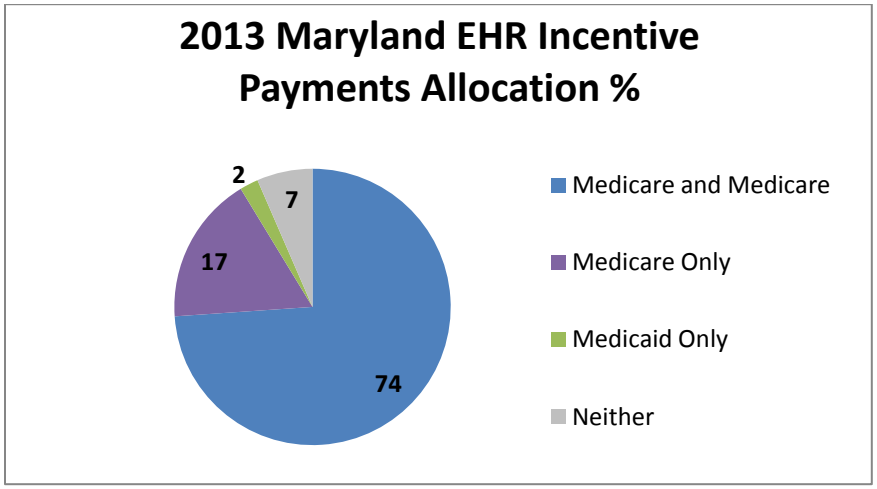
- 93 percent of hospitals received incentive payments in 2013 for AIU and/or attesting to MU; nationally, 86 percent of hospitals received incentive payments[88, 89, 90]
- 74 percent of hospitals in Maryland received more than one incentive payment by participating in both the Medicare and Medicaid EHR Incentive Programs in 2013[91]
- In 2013, three hospitals did not receive an incentive payment; those hospitals indicated plans to attest for both the Medicare and Medicaid EHR Incentive Programs in the next few years[92]



Note: The MU program began in 2011.



Note: The MU program began in 2011; national data on hospital incentive payments distributed in 2011 is unavailable.



[86] CMS, *August 2014 EHR Incentive Program*. Available at: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/August2014_SummaryReport.pdf.
[87] HealthIT.gov, *Share of Hospitals that Received a CMS EHR Incentive Program payment.*
[88] CMS, *EHR Incentive Programs Data Brief*, November 2013. Available at: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/DataBrief_November2013-.pdf.
[89] ONC; CMS, www.data.gov.
[90] MU participation and receipt of incentive payment may span two calendar years depending on the MU participation cycle. Figures reported represent MU participation timeframes and are not indicative of receipt of payment.
[91] Refer to Appendix F for a detailed listing of incentive payments by EHR Incentive program received by hospitals in 2013.
[92] All hospitals in Maryland are registered for at least one EHR Incentive Program. Refer to Appendix F for information on registration status by hospital, as of 2013.

Incentive Payments

Since 2011, 44 Maryland hospitals have received at least one incentive payment; hospitals rank as follows from the highest to lowest amount of incentives received from 2011 through 2013.

1. *Sinai Hospital*
2. *Frederick Memorial Hospital*
3. *Johns Hopkins Bayview Medical Center*
4. *St. Agnes Hospital*
5. *Holy Cross Hospital*
6. *Johns Hopkins Hospital*
7. *Western Maryland Health System*
8. *Mercy Medical Center*
9. *Northwest Hospital Center*
10. *Peninsula Regional Medical Center*
11. *Anne Arundel Medical Center*
12. *MedStar Franklin Square Medical Center*
13. *Doctors Community Hospital*
14. *Carroll Hospital Center*
15. *University of Maryland Upper Chesapeake Medical Center*
16. *University of Maryland Medical Center*
17. *Meritus Medical Center*
18. *MedStar Harbor Hospital*
19. *MedStar Good Samaritan Hospital*
20. *MedStar Montgomery Medical Center*
21. *University of Maryland Baltimore Washington Medical Center*
22. *MedStar Union Memorial Hospital*
23. *MedStar St. Mary's Hospital*
24. *Greater Baltimore Medical Center*
25. *Howard County General Hospital*
26. *Laurel Regional Hospital*
27. *Prince Georges Hospital Center*[93]
28. *Washington Adventist Hospital*
29. *Calvert Memorial Hospital*
30. *Union Hospital of Cecil County*
31. *University of Maryland Shore Medical Center at Dorchester*
32. *University of Maryland Shore Medical Center at Easton*[94]
33. *Shady Grove Adventist Hospital*
34. *Harford Memorial Hospital*
35. *Suburban Hospital*
36. *Atlantic General Hospital*
37. *Edward McCready Memorial Hospital*
38. *University of Maryland Charles Regional Medical Center*
39. *University of Maryland Medical Center Midtown Campus*
40. *Fort Washington Medical Center*
41. *University of Maryland Shore Medical Center at Chestertown*
42. *Garrett County Memorial Hospital*
43. *University of Maryland Rehabilitation & Orthopedic Institute*
44. *Bon Secours Baltimore Health System*

[93] Laurel Regional Hospital and Prince Georges Hospital Center received the same amount in incentive payments as of July 2014.

[94] Incentive payments were combined for both the University of Maryland Shore Medical Center at Dorchester and University of Maryland Shore Medical Center at Easton.

REMARKS

Maryland hospitals have invested heavily in the adoption and use of health IT. Since the passage of HITECH and the PPACA, health IT adoption has notably increased and hospitals are continuing to seek new strategies for improving the quality and efficiency of care using technology. Tremendous activity is occurring to address the MU challenges. Over the next year, hospitals are encouraged to bolster efforts related to online access and transmission of patient health information. Electronic health information exchange is a key requirement of MU Stage 2.

Most hospitals viewed 2014 as an important year for the EHR Incentive Programs as it is the first year that penalties apply for not achieving the MU requirements. Hospitals that received EHR Incentive Program payments are now subject to a federal audit. Hospitals should prepare for a potential audit by minimally ensuring: proof of ownership of a certified EHR; the existence of documentation on the reporting method used to incorporate emergency department patients; availability of core and menu measures MU reports used to enter attestation data; and documentation for yes attestation measures to evidence the measure has been met.

The role of CIOs has evolved from what was generally viewed as tactical and problem solving to strategic and visionary, which is essential to move hospitals into the future. CIOs throughout the State have done a laudable job in aligning health IT goals and strategies to keep pace with the rapidly changing care delivery landscape. Their collective health IT initiatives have resulted in establishing a system-wide technical infrastructure that is essential in Maryland to transform care delivery, reduce per capita expenditures, and improve health outcomes.

ACKNOWLEDGEMENTS

The MHCC would like to thank CIOs for their contributions to this sixth annual health IT assessment of Maryland hospitals. The MHCC also appreciates the donation of time by CIOs in reviewing the draft report.

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Calvert Memorial Hospital
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Doctors Community Hospital
Alan Johnson
Chief Information Officer

Edward McCready Memorial Hospital
Joy Strand
Chief Executive Officer

Fort Washington Medical Center
Fred Ashby
Director, Information Technology/ Telecommunications

Frederick Memorial Hospital
David Quirke
Vice President, Chief Information Officer

Garrett County Memorial Hospital
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Greater Baltimore Medical Center
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Suburban Hospital
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University of Maryland Charles Regional Medical Center
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University of Maryland Medical Center Midtown Campus
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University of Maryland Rehabilitation & Orthopedic Institute
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Senior Vice President & Chief Information Officer

University of Maryland Shore Medical Center at Chestertown
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University of Maryland Shore Medical Center at Dorchester
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Senior Vice President & Chief Information Officer

University of Maryland Shore Medical Center at Easton
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University of Maryland St. Joseph Medical Center
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University of Maryland Upper Chesapeake Medical Center
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Western Maryland Health System
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Vice President, Chief Information Officer

APPENDIX A: 2013 SURVEY QUESTIONS

Listed below are the questions included in the *2013 Hospital Health Information Technology Survey*. Hospital responses indicating they had not yet adopted a technology were asked to answer the following planning question.

Planning Questions

If no to implementing a technology, is your hospital:

- Assessing the technology within 12 months?
- Implementing the technology within 12 months?
- Implementing the technology within two years or beyond?
- Undecided about an implementation strategy at this time?

Section 1: Hospital Departments

1) Enter the total number of departments within your hospital for each category:
   - Emergency department
   - Outpatient
   - Surgical
   - Pediatrics
   - Psychiatric
   - Rehabilitation
   - Inpatient
   - Other (specify)

Section 2: Order Entry

2) Has your hospital adopted an order entry system where providers (MD, DO, NP, PA) can electronically enter patient care orders?
   - How many departments use this technology?

3) Which orders can the provider enter electronically:
   - Medications
   - Laboratory
   - Radiology
   - Nursing
   - Respiratory
   - Ultrasound
   - PT/OT
   - Consultation Requests
   - Dietary
   - Other (specify)

4) Does the order entry system offer medication prescribing decision support software for drug-drug interaction checks?
   - How many departments use this technology?

5) Does this system offer medication prescribing decision support software for drug-allergy interaction checks?
   - How many departments use this technology?

6) Does this system offer decision support software for medication prescribing for basic dosing guidance?
   - How many departments use this technology?

Section 3: Electronic Health Records

7) Has your hospital adopted an EHR?

- If yes, identify your EHR vendor:
- How many departments use an EHR?

8) Enter the total number of departments that use the following EHR features. Enter zero if the feature is not in use:

Clinical Documentation

- Demographic Characteristics of Patients
- Physicians' Notes
- Nursing Assessments
- Problem Lists
- Medication Lists
- Discharge Summaries
- Advance Directives

Test and Imaging Results

- Laboratory Reports
- Radiologic Reports
- Radiologic Images
- Consultant Reports

Decision Support

- Clinical Guidelines
- Clinical Reminders
- Drug-laboratory Interaction Alerts (e.g., dioxin and low level of serum potassium)

Section 4: Medication Administration

9) Has your hospital adopted an electronic medication administration record (eMAR)?

- How many departments use this technology?

10) Has your hospital adopted a Bar Code Medication Administration (BCMA) system for medication administration at the bedside?

- How many departments use this technology?

Section 5: Infection Management

11) Has your hospital adopted infection surveillance software to manage infectious diseases?

Section 6: Electronic Prescribing

12) Has your hospital adopted a system to electronically prescribe (e-prescribe) discharge medications directly to community pharmacies?

- How many departments use this technology?

13) Does your hospital use a stand-alone or integrated e-prescribing system?

14) If integrated, is your e-prescribing system part of an EHR?

15) Has your hospital adopted a system to electronically prescribe (e-prescribe) medications internally to the hospital pharmacy?

- How many departments use this technology?

Section 7: Health Information Exchange

16) Is your hospital using the Chesapeake Regional Information System for our Patients (CRISP) Portal to query the statewide Health Information Exchange (HIE)?

17) Enter the number of departments that have access to the HIE:

- Emergency Department
- Outpatient
- Surgical
- Pediatrics
- Psychiatric
- Rehabilitation
- Inpatient
- Other (specify)

18) Has your hospital implemented a patient portal?

Section 8: Telemedicine

19) Has your hospital adopted telemedicine?

20) If yes, is your hospital using telemedicine:

- Internal to your organization
- External to your organization

21) Is your hospital using telemedicine for the following purposes? (enter the number of departments that use this technology)

- Imaging
- Diagnostic (i.e. echocardiography, EEG, etc)
- Remote monitoring
- Emergency
- Consultation
- Tele-radiology
- Trauma
- Behavioral Health
- Other (specify)

22) Is your hospital using the following equipment for telemedicine? (enter the number of departments that use this technology)

- Interactive video/audio (real-time)
- Store-and-forward software
- Robotics
- Home monitoring devices
- Telemedicine carts
- Mobile devices (i.e. iPads, Tablets, etc.)
- Cloud-based systems (i.e. for remote monitoring or image review/distribution)
- Other (specify)

Section 9: Meaningful Use

23) Select one of the following to identify your hospital's participation in the Medicare and Medicaid EHR Incentive Programs for calendar year 2013.

- Medicare EHR Incentive Program only

- Medicaid EHR Incentive Program only
- Both Medicare and Medicaid EHR Incentive Programs
- Neither the Medicare nor the Medicaid EHR Incentive Program

24) Select one of the following that identifies your hospital's submission to Medicaid for the CMS EHR Incentive Program (A/I/U):

- Adopted an EHR
- Implemented an EHR
- Upgraded your EHR to a certified version of the system
- Demonstrated Meaningful Use

25) Enter responses to the following meaningful use measures:

Core Objectives

- Computerized provider order entry (enter threshold)
- Drug-drug and drug-allergy interaction checks (attest, yes/no)
- Record demographics (enter threshold)
- Implement one clinical decision support rule (attest, yes/no)
- Maintain up-to-date problem list of current and active diagnoses (enter threshold)
- Maintain active medication list (enter threshold)
- Maintain active medication allergy list (enter threshold)
- Record and chart changes in vital signs (enter threshold)
- Record smoking status for patients 13 years or older (enter threshold)
- Report hospital clinical quality measures to CMS or States (attest, yes/no)
- Provide patients with an electronic copy of their health information, upon request (enter threshold)
- Provide patients with an electronic copy of their discharge instructions at time of discharge, upon request (enter threshold)
- Protect electronic health information (attest, yes/no)

Menu Objectives

- Drug-formulary checks (attest, yes/no)
- Record advanced directives for patients 65 years or older (enter threshold)
- Incorporate clinical lab test results as structured data (enter threshold)
- Generate lists of patients by specific conditions (attest, yes/no)
- Use certified EHR technology to identify patient-specific education resources and provide to patient, if appropriate (enter threshold)

- Medication reconciliation (enter threshold)
- Summary of care record for each transition of care/referrals (enter threshold)
- Capability to submit electronic data to immunization registries/systems** (attest, yes/no)
- Capability to provide electronic submission of reportable lab results to public health agencies** (attest, yes/no)
- Capability to provide electronic syndromic surveillance data to public health agencies** (attest, yes/no)

***Public health objectives*

26) Is your hospital (select one):

   a. Planning to attest for the Medicare EHR Incentive Program in calendar year 2013?
   b. Planning to attest for the Medicare EHR Incentive Program in calendar year 2014 or beyond?
   c. Undecided about applying for the Medicare EHR incentive program at this time?

27) Is your hospital (select one):

   a. Planning to attest for the Medicaid EHR Incentive Program in calendar year 2013?
   b. Planning to attest for the Medicaid EHR Incentive Program in calendar year 2014 or beyond?
   c. Undecided about applying for the Medicaid EHR Incentive Program at this time?

28) CMS payment data captures incentives distributed to date. Please confirm your hospital's receipt of incentive payment(s) in accordance with the time intervals noted below.

Medicare

- 90 days attestation
- 12 months implementation (2013)

Medicaid

- 90 days attestation
- 12 months implementation (2013)

APPENDIX B: COMPREHENSIVE SUMMARY OF HEALTH IT DIFFUSION WITHIN HOSPITAL DEPARTMENTS

The three tables below detail diffusion of health IT adoption by hospital, including the number and percent of hospital departments that utilized the specified technology in 2013. Hospitals were not asked to identify the number of departments that utilize ISS or patient portals; as such, hospitals that have adopted these technologies are noted with a check mark (✓). Strikethroughs (-) indicates a technology/service not yet adopted by a hospital.

EHRs/CPOE/eMAR/BCMA/e-Prescribing/ISS/Patient Portals

Diffusion of Health IT within Hospital Departments															
Maryland Hospitals N=46		EHRs		CPOE		eMAR		BCMA		e-Prescribe Internally		e-Prescribe Externally		ISS	Patient Portal
	Departments													✓	✓
	Total	#	%	#	%	#	%	#	%	#	%	#	%		
Anne Arundel Medical Center	39	39	100	39	100	39	100	32	82	32	82	34	87		✓
Atlantic General Hospital	6	3	50	6	100	3	50	2	33	-	-	2	33		
Bon Secours Baltimore Health System	11	-	-	-	-	-	-	-	-	-	-	-	-		
Calvert Memorial Hospital	26	23	88	26	100	17	65	15	58	13	50	-	-		
Carroll Hospital Center	15	15	100	15	100	11	73	11	73	-	-	-	-	✓	
Doctors Community Hospital	24	24	100	19	79	9	38	9	38	-	-	-	-		
Edward McCready Memorial Hospital	11	10	91	8	73	2	18	-	-	-	-	2	18	✓	
Fort Washington Medical Center	55	13	24	4	7	7	13	2	4	-	-	-	-		
Frederick Memorial Hospital	58	58	100	58	100	58	100	58	100	58	100	29	50	✓	
Garrett County Memorial Hospital	5	5	100	5	100	4	80	4	80	4	80	-	-		
Greater Baltimore Medical Center	7	7	100	7	100	2	29	1	14	2	29	1	14		
Harford Memorial Hospital	10	10	100	10	100	8	80	5	50	8	80	-	-	✓	
Holy Cross Hospital	31	31	100	31	100	31	100	19	61	31	100	-	-	✓	✓
Howard County General Hospital	40	40	100	40	100	18	45	18	45	-	-	3	8	✓	✓
Johns Hopkins Bayview Medical Center	24	23	96	22	92	21	88	21	88	22	92	-	-		✓

Diffusion of Health IT within Hospital Departments															
Maryland Hospitals N=46		EHRs		CPOE		eMAR		BCMA		e-Prescribe Internally		e-Prescribe Externally		ISS	Patient Portal
	Departments													✓	✓
	Total	#	%	#	%	#	%	#	%	#	%	#	%		
Johns Hopkins Hospital	79	79	100	79	100	73	92	-	-	73	92	-	-	✓	✓
Laurel Regional Hospital	24	24	100	24	100	24	100	24	100	-	-	24	100	✓	
Medstar Franklin Square Medical Center	60	60	100	60	100	20	33	20	33	60	100	60	100		✓
Medstar Good Samaritan Hospital	132	22	17	22	17	15	11	15	11	12	9	12	9		✓
Medstar Harbor Hospital	40	40	100	22	55	35	88	21	53	-	-	22	55	✓	
Medstar Montgomery Medical Center	14	14	100	14	100	8	57	8	57	-	-	-	-		
Medstar Southern Maryland Hospital	27	18	67	27	100	20	74	15	56	20	74	20	74		
Medstar St. Mary's Hospital	16	16	100	16	100	16	100	8	50	-	-	11	69		
Medstar Union Memorial Hospital	53	53	100	53	100	51	96	53	100	53	100	53	100	✓	
Mercy Medical Center	16	10	63	10	63	10	63	10	63	10	63	-	-	✓	✓
Meritus Medical Center	37	37	100	37	100	16	43	16	43	-	-	1	3	✓	
Northwest Hospital Center	13	13	100	13	100	13	100	13	100	1	8	1	8	✓	✓
Peninsula Regional Medical Center	23	23	100	23	100	23	100	22	96	22	96	-	-	✓	✓
Prince Georges Hospital Center	31	31	100	31	100	31	100	31	100	-	-	31	100	✓	
Shady Grove Adventist Hospital	32	32	100	2	6	32	100	32	100	-	-	-	-		✓
Sinai Hospital	15	15	100	15	100	15	100	15	100	2	13	2	13	✓	✓
St. Agnes Hospital	34	23	68	24	71	14	41	11	32	-	-	-	-		
Suburban Hospital	14	14	100	8	57	8	57	8	57	-	-	-	-		
Union Hospital of Cecil County	33	33	100	33	100	33	100	33	100	33	100	33	100	✓	

Diffusion of Health IT within Hospital Departments															
Maryland Hospitals N=46		EHRs		CPOE		eMAR		BCMA		e-Prescribe Internally		e-Prescribe Externally		ISS	Patient Portal
	Departments													✓	✓
	Total	#	%	#	%	#	%	#	%	#	%	#	%		
University of Maryland Baltimore Washington Medical Center	32	32	100	32	100	32	100	-	-	32	100	32	100	✓	✓
University of Maryland Charles Regional Medical Center	6	1	17	1	17	2	33	2	33	-	-	-	-		✓
University of Maryland Medical Center	78	78	100	77	99	66	85	-	-	-	-	-	-	✓	✓
University of Maryland Medical Center Midtown Campus	46	44	96	-	-	9	20	9	20	-	-	3	7	✓	✓
University of Maryland Rehabilitation & Orthopedic Institute	38	37	97	37	97	37	97	-	-	19	50	37	97		✓
University of Maryland Shore Medical Center at Chestertown	10	8	80	5	50	4	40	3	30	-	-	-	-		✓
University of Maryland Shore Medical Center at Dorchester	9	8	89	8	89	4	44	3	33	-	-	-	-		✓
University of Maryland Shore Medical Center at Easton	20	20	100	20	100	9	45	7	35	-	-	-	-		✓
University of Maryland St. Joseph Medical Center	25	-	-	-	-	21	84	21	84	-	-	-	-		
University of Maryland Upper Chesapeake Medical Center	12	12	100	12	100	9	75	7	58	7	58	-	-	✓	✓
Washington Adventist Hospital	18	18	100	1	6	18	100	18	100	-	-	-	-		✓
Western Maryland Health System	24	24	100	14	58	22	92	22	92	14	58	-	-	✓	✓
Total: Maryland Hospitals (%)		**96**		**93**		**98**		**87**		**48**		**46**		**48**	**50**
Total: Hospitals Nationally[95] (%)		**94**		**86**		**60**		**50**		**-**		**63**		**20-25**	**50**

Note: A strikethrough (-) indicates national comparison data that is unavailable.

[95] Refer to the *Hospital Health IT Adoption* section of this report for national data sources.

Telehealth Technologies

Diffusion of Telehealth Technologies Within Hospital Departments																
Maryland Hospitals n=28	Interactive Video/Audio		Store-and Forward Software		Robotics		Home Monitoring Devices		Telehealth Carts		Mobile Devices[96]		Cloud-Based Systems[97]		Other	
	Departments															
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Anne Arundel Medical Center	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atlantic General Hospital	1	17	1	17	-	-	-	-	-	-	-	-	-	-	-	-
Bon Secours Baltimore Health System	1	9	1	9	1	9	-	-	-	-	-	-	-	-	-	-
Calvert Memorial Hospital	2	8	2	8	-	-	-	-	-	-	-	-	-	-	1	4
Carroll Hospital Center	1	7	1	7	-	-	1	7	-	-	1	7	-	-	-	-
Doctors Community Hospital	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-
Fort Washington Medical Center	1	2	3	5	-	-	-	-	-	-	-	-	-	-	-	-
Frederick Memorial Hospital	1	2	1	2	1	2	1	2	1	2	-	-	1	2	-	-
Holy Cross Hospital	2	6	-	-	-	-	-	-	4	13	-	-	-	-	-	-
Howard County General Hospital	2	5	-	-	-	-	-	-	1	3	-	-	-	-	-	-
Johns Hopkins Hospital	-	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-
Medstar Franklin Square Medical Center	1	2	-	-	-	-	-	-	-	-	-	-	1	2	-	-
Medstar Good Samaritan Hospital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
Medstar Montgomery Medical Center	1	7	-	-	-	-	-	-	1	7	-	-	-	-		
Medstar Southern Maryland Hospital	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medstar St. Mary's Hospital	1	6	-	-	-	-	-	-	1	6	-	-	-	-	-	-

[96] Mobile devices include iPads, tablets, etc.
[97] Cloud-based systems are used for services such as remote monitoring or image review/distribution.

Diffusion of Telehealth Technologies Within Hospital Departments

Maryland Hospitals n=28	Interactive Video/Audio		Store-and Forward Software		Robotics		Home Monitoring Devices		Telehealth Carts		Mobile Devices[96]		Cloud-Based Systems[97]		Other	
	Departments															
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Mercy Medical Center	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-
Meritus Medical Center	1	3	-	-	-	-	-	-	1	3	-	-	1	3	-	-
Peninsula Regional Medical Center	4	17	-	-	-	-	-	-	4	17	3	13	2	9	-	-
Shady Grove Adventist Hospital	-	-	-	-	-	-	1	3	-	-	1	3	1	3	-	-
Suburban Hospital	-	-	-	-	-	-	-	-	-	-	-	-	1	7	-	-
Union Hospital of Cecil County	1	3	1	3	-	-	-	-	-	-	1	3	-	-	-	-
University of Maryland Baltimore Washington Medical Center	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
University of Maryland Medical Center	10	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
University of Maryland Shore Medical Center at Chestertown	1	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
University of Maryland Shore Medical Center at Dorchester	1	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
University of Maryland Shore Medical Center at Easton	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington Adventist Hospital	-	-	-	-	-	-	1	6	-	-	1	6	1	6	-	-
Total: Maryland Hospitals (#)	**21**		**9**		**2**		**4**		**8**		**5**		**7**		**2**	

Note: Other technologies may include intra-operative neurophysiological monitors or electronic ICU program software that assist with physician or nurse shortages.

Telehealth Services

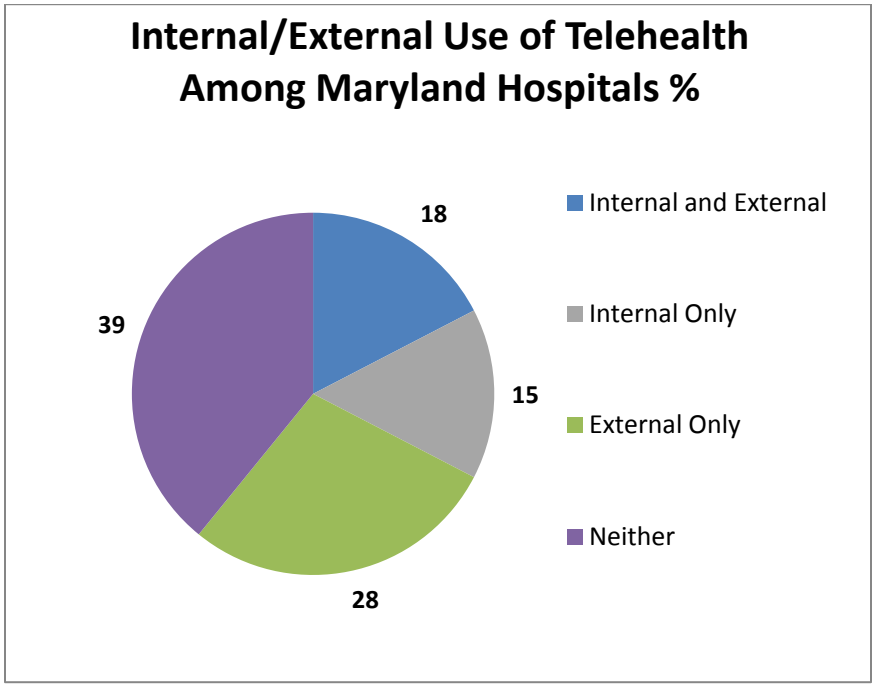
Diffusion of Telehealth Services within Hospital Departments																		
Maryland Hospitals n=28	Behavioral Health		Consultation		Diagnostic		Emergency		Imaging		Remote Monitoring		Tele-radiology		Trauma		Other	
	Departments																	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Anne Arundel Medical Center	-	-	2	5	2	5	-	-	-	-	-	-	-	-	-	-	-	-
Atlantic General Hospital	-	-	-	-	-	-	-	-	1	17	1	17	-	-	-	-	-	-
Bon Secours Baltimore Health System	-	-	1	9	1	9	-	-	-	-	1	9	-	-	-	-	-	-
Calvert Memorial Hospital	-	-	-	-	1	4	1	4	1	4	1	4	1	4	-	-	1	4
Carroll Hospital Center	-	-	1	7	-	-	1	7	1	7	1	7	1	7	-	-	-	-
Doctors Community Hospital	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fort Washington Medical Center	-	-	-	-	1	2	-	-	1	2	-	-	1	2	-	-	1	2
Frederick Memorial Hospital	-	-	1	2	1	2	-	-	1	2	1	2	1	2	-	-	1	2
Holy Cross Hospital	-	-	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Howard County General Hospital	-	-	-	-	-	-	-	-	1	3	-	-	1	3	-	-	-	-
Johns Hopkins Hospital	-	-	3	4	6	8	-	-	6	8	-	-	-	-	-	-	-	-
Medstar Franklin Square Medical Center	-	-	1	2	-	-	-	-	1	2	-	-	1	2	-	-	-	-
Medstar Good Samaritan Hospital	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-
Medstar Montgomery Medical Center	-	-	-	-	-	-	1	7	-	-	-	-	1	7	-	-	-	-
Medstar Southern Maryland Hospital	-	-	-	-	1	4	-	-	-	-	1	4	-	-	-	-	-	-
Medstar St. Mary's Hospital	-	-	-	-	1	6	-	-	-	-	1	6	14	88	-	-	-	-
Mercy Medical Center	-	-	-	-	1	6	-	-	1	6	-	-	1	6	-	-	-	-

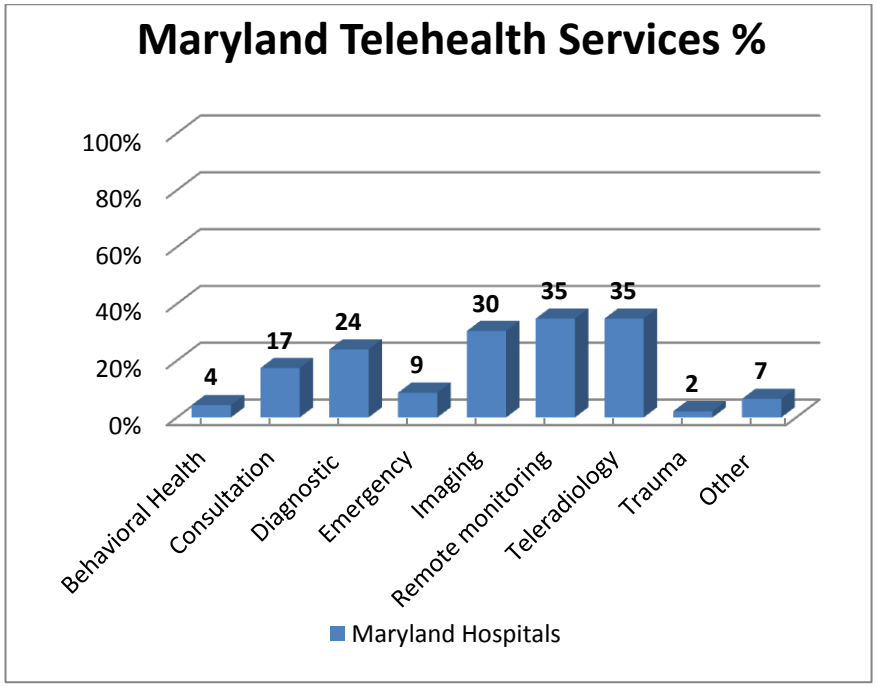
Diffusion of Telehealth Services within Hospital Departments

Maryland Hospitals n=28	Behavioral Health		Consultation		Diagnostic		Emergency		Imaging		Remote Monitoring		Tele-radiology		Trauma		Other	
	Departments																	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Meritus Medical Center	-	-	-	-	-	-	-	-	1	3	1	3	1	3	1	3	-	-
Peninsula Regional Medical Center	1	4	4	17	2	9	1	4	4	17	1	4	2	9	-	-	-	-
Shady Grove Adventist Hospital	-	-	-	-	-	-	-	-	-	-	1	3	1	3	-	-	-	-
Suburban Hospital	-	-	-	-	-	-	-	-	-	-	-	-	1	7	-	-	-	-
Union Hospital of Cecil County	-	-	-	-	1	3	-	-	1	3	1	3	1	3	-	-	-	-
University of Maryland Baltimore Washington Medical Center	-	-	-	-	-	-	-	-	1	3	-	-	1	3	-	-	-	-
University of Maryland Medical Center	-	-	-	-	-	-	-	-	-	-	10	13	-	-	-	-	-	-
University of Maryland Shore Medical Center at Chestertown	-	-	-	-	-	-	-	-	-	-	1	10	-	-	-	-	-	-
University of Maryland Shore Medical Center at Dorchester	-	-	-	-	-	-	-	-	-	-	1	11	-	-	-	-	-	-
University of Maryland Shore Medical Center at Easton	-	-	-	-	-	-	-	-	-	-	1	5	-	-	-	-	-	-
Washington Adventist Hospital	-	-	-	-	-	-	-	-	-	-	1	6	1	6	-	-	-	-
Total: Maryland Hospitals (#)	**2**		**8**		**11**		**4**		**14**		**17**		**2**		**1**		**3**	

Note: Other services may include services rendered in a hospital's Intensive Care Unit.

Telehealth Services (continued)





Note: Other includes services rendered in a hospital's Intensive Care Unit

APPENDIX C: HEALTH IT ADOPTION ANNUAL GROWTH RATE

The chart below identifies baseline information on the number of hospitals that reported the adoption of a specified technology in 2008 and 2013. These figures were used to calculate the compound annual growth rate (CAGR) over five periods. CAGR is the measure of growth over multiple periods and helps illustrate the average rate of growth and the potential future growth of each technology.

Health IT Adoption Annual Growth Rate

Technology	2008 # of Hospitals	2013 # of Hospitals	CAGR %
BCMA	14	40	23.4
CDS	17	43	20.4
CPOE	24	43	12.4
EHRs	34	44	5.3
eMAR	24	45	13.4
e-Prescribing	4	22	40.6
ISS	18	22	4.1

APPENDIX D: COMPUTERIZED PHYSICIAN ORDER ENTRY/CLINICAL DECISION SUPPORT

The table below identifies the types of orders entered electronically as well as clinical decision support (CDS) functionalities utilized by each hospital in 2013. A check mark (✓) indicates those hospitals that enter the specified order electronically or utilize the specified CDS functionality.

Maryland Hospitals N=46	Types of Orders Entered Electronically										CDS Functionalities		
	Medication	Laboratory	Radiology	Nursing	Respiratory	Ultrasound	PT/OT	Consultation Requests	Dietary	Other	Drug-Drug Interaction Checks	Drug-Allergy Interaction Checks	Basic Dosing Guidance
Anne Arundel Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Atlantic General Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Bon Secours Baltimore Health System													
Calvert Memorial Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Carroll Hospital Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Doctors Community Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Edward McCready Memorial Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Fort Washington Medical Center	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
Frederick Memorial Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Garrett County Memorial Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Greater Baltimore Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Harford Memorial Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Holy Cross Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Howard County General Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Johns Hopkins Bayview Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Johns Hopkins Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

Maryland Hospitals N=46	Types of Orders Entered Electronically										CDS Functionalities		
	Medication	Laboratory	Radiology	Nursing	Respiratory	Ultrasound	PT/OT	Consultation Requests	Dietary	Other	Drug-Drug Interaction Checks	Drug-Allergy Interaction Checks	Basic Dosing Guidance
Laurel Regional Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Medstar Franklin Square Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Medstar Good Samaritan Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Medstar Harbor Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Medstar Montgomery Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Medstar Southern Maryland Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Medstar St. Mary's Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Medstar Union Memorial Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Mercy Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Meritus Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Northwest Hospital Center		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Peninsula Regional Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Prince Georges Hospital Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Shady Grove Adventist Hospital	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
Sinai Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
St. Agnes Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Suburban Hospital	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	
Union Hospital of Cecil County	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

Maryland Hospitals N=46	Types of Orders Entered Electronically										CDS Functionalities		
	Medication	Laboratory	Radiology	Nursing	Respiratory	Ultrasound	PT/OT	Consultation Requests	Dietary	Other	Drug-Drug Interaction Checks	Drug-Allergy Interaction Checks	Basic Dosing Guidance
University of Maryland Baltimore Washington Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
University of Maryland Charles Regional Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
University of Maryland Medical Center	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
University of Maryland Medical Center Midtown Campus													
University of Maryland Rehabilitation & Orthopedic Institute	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
University of Maryland Shore Medical Center at Chestertown	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
University of Maryland Shore Medical Center at Dorchester	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
University of Maryland Shore Medical Center at Easton	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
University of Maryland St. Joseph Medical Center													
University of Maryland Upper Chesapeake Medical Center	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Washington Adventist Hospital	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
Western Maryland Health System	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Total: Maryland Hospitals (%)	**91**	**93**	**93**	**93**	**93**	**93**	**89**	**83**	**89**	**-**	**93**	**93**	**89**
Total: Hospitals Nationally[98] (%)	**86**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**93**	**93**	**-**

Note: Strikethroughs (-) indicate national comparison data that is unavailable.

[98] ONC, *U.S. Hospital Adoption of Computerized Capabilities to Meet Meaningful Use Stage 1 Objectives 2011-2013*, Health IT Quick-Stat, No. 22, April 2014. Available at: dashboard.healthit.gov/quickstats/PDFs/Health-IT-Quick-Stat-Hospital-Adoption-Meaningful-Use-Stage-One-2013.pdf .

APPENDIX E: HOSPITALS PARTICIPATION WITH THE STATE-DESIGNATED HIE

The table below details hospitals data submission to the Chesapeake Regional Information System for our Patients (CRISP) and adoption of select CRISP services in 2013. A check mark (✓) indicates those hospitals that submit the specified data to CRISP or have adopted the specified CRISP service.

Maryland Hospitals N=46	**Hospital Data Submission to CRISP**				**Adoption of CRISP Services**	
	ADT Data	Laboratory Reports	Radiology Reports	Transcribed Documents	Query Portal	PDMP
Anne Arundel Medical Center	✓	✓	✓		✓	✓
Atlantic General Hospital	✓	✓	✓	✓	✓	
Bon Secours Baltimore Health System	✓	✓	✓		✓	✓
Calvert Memorial Hospital	✓	✓	✓	✓	✓	✓
Carroll Hospital Center	✓	✓	✓	✓	✓	✓
Doctors Community Hospital	✓	✓	✓	✓	✓	✓
Edward McCready Memorial Hospital	✓	✓			✓	
Fort Washington Medical Center Hospital	✓	✓	✓	✓	✓	✓
Frederick Memorial Hospital	✓	✓	✓		✓	
Garrett County Memorial Hospital	✓	✓	✓			
Greater Baltimore Medical Center	✓	✓	✓	✓	✓	✓
Harford Memorial Hospital	✓	✓	✓	✓	✓	✓
Holy Cross Hospital	✓	✓	✓	✓	✓	✓
Howard County General Hospital	✓	✓	✓	✓	✓	✓
Johns Hopkins Bayview Medical Center	✓		✓	✓	✓	✓
Johns Hopkins Hospital	✓		✓	✓	✓	✓
Laurel Regional Hospital	✓			✓	✓	✓

Maryland Hospitals N=46	Hospital Data Submission to CRISP				Adoption of CRISP Services	
	ADT Data	Laboratory Reports	Radiology Reports	Transcribed Documents	Query Portal	PDMP
Medstar Franklin Square Medical Center	✓	✓	✓	✓	✓	✓
Medstar Good Samaritan Hospital	✓	✓	✓	✓	✓	✓
Medstar Harbor Hospital	✓	✓	✓	✓	✓	✓
Medstar Montgomery Medical Center	✓	✓	✓	✓	✓	✓
Medstar Southern Maryland Hospital	✓		✓	✓		
Medstar St. Mary's Hospital	✓	✓	✓	✓	✓	
Medstar Union Memorial Hospital	✓	✓	✓	✓	✓	✓
Mercy Medical Center	✓		✓		✓	✓
Meritus Medical Center	✓	✓	✓	✓	✓	✓
Northwest Hospital Center	✓	✓	✓	✓	✓	✓
Peninsula Regional Medical Center	✓				✓	✓
Prince Georges Hospital Center	✓			✓	✓	✓
Shady Grove Adventist Hospital	✓	✓	✓	✓	✓	✓
Sinai Hospital	✓	✓	✓	✓	✓	✓
St. Agnes Hospital	✓	✓	✓	✓	✓	✓
Suburban Hospital	✓	✓	✓	✓	✓	✓
Union Hospital of Cecil County	✓	✓	✓	✓	✓	✓
University of Maryland Baltimore Washington Medical Center	✓				✓	✓
University of Maryland Charles Regional Medical Center	✓				✓	✓
University of Maryland Medical Center	✓			✓	✓	✓

Maryland Hospitals N=46	Hospital Data Submission to CRISP				Adoption of CRISP Services	
	ADT Data	Laboratory Reports	Radiology Reports	Transcribed Documents	Query Portal	PDMP
University of Maryland Medical Center Midtown Campus	✓		✓	✓	✓	✓
University of Maryland Rehabilitation & Orthopedic Institute	✓			✓		
University of Maryland Shore Medical Center at Chestertown	✓				✓	✓
University of Maryland Shore Medical Center at Dorchester	✓					
University of Maryland Shore Medical Center at Easton	✓				✓	
University of Maryland St. Joseph Medical Center	✓	✓	✓		✓	✓
University of Maryland Upper Chesapeake Medical Center	✓	✓	✓	✓	✓	✓
Washington Adventist Hospital	✓	✓	✓	✓	✓	✓
Western Maryland Health System	✓	✓	✓	✓	✓	
Total: Maryland Hospitals (%)	**100**	**67**	**76**	**72**	**91**	**78**
Total: Hospitals Nationally (%)[99]	-	**57**	**55**	**42**	-	-

Note: Strikethroughs (-) indicate national comparison data that is unavailable.

[99] ONC, *ONC Data Brief No.17: Health Information Exchange among U.S. Non-federal Acute Care Hospitals: 2008-2013*, May 2014. Available here: www.healthit.gov/sites/default/files/oncdatabrief17_hieamonghospitals.pdf.

APPENDIX F: EHR INCENTIVE PROGRAMS

The table below details hospitals participation in the EHR Incentive Programs including incentive payments received as of 2013. A check mark (✓) indicates those hospitals that have registered in the specified EHR Incentive Program; a dollar sign ($) indicates those hospitals that received an incentive payment in 2013.

Maryland Hospitals N=46	Registration in the EHR Incentive Programs		EHR Incentive Program Activity in 2013		
			Incentive Payment(s) Received		Submission to Medicaid
	Medicare	Medicaid	Medicare	Medicaid	
Anne Arundel Medical Center	✓	✓	$	$	Upgraded to a certified EHR
Atlantic General Hospital	✓		$		Participated in Medicare only
Bon Secours Baltimore Health System	✓	✓		$	Implemented an EHR
Calvert Memorial Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Carroll Hospital Center	✓	✓	$	$	Upgraded to a certified EHR
Doctors Community Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Edward McCready Memorial Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Fort Washington Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
Frederick Memorial Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Garrett County Memorial Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Greater Baltimore Medical Center	✓		$		Participated in Medicare only
Harford Memorial Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Holy Cross Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Howard County General Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Johns Hopkins Bayview Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
Johns Hopkins Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Laurel Regional Hospital	✓	✓	$	$	Demonstrated Meaningful Use

Maryland Hospitals N=46	Registration in the EHR Incentive Programs		EHR Incentive Program Activity in 2013		
			Incentive Payment(s) Received		Submission to Medicaid
	Medicare	Medicaid	Medicare	Medicaid	
Medstar Franklin Square Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
Medstar Good Samaritan Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Medstar Harbor Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Medstar Montgomery Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
Medstar Southern Maryland Hospital	✓	✓			Did not participate
Medstar St. Mary's Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Medstar Union Memorial Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Mercy Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
Meritus Medical Center	✓		$		Participated in Medicare only
Northwest Hospital Center	✓	✓	$	$	Demonstrated Meaningful Use
Peninsula Regional Medical Center	✓	✓	$		Participated in Medicare only
Prince Georges Hospital Center	✓	✓	$	$	Demonstrated Meaningful Use
Shady Grove Adventist Hospital	✓	✓	$		Participated in Medicare only
Sinai Hospital	✓	✓	$	$	Demonstrated Meaningful Use
St. Agnes Hospital	✓	✓	$	$	Demonstrated Meaningful Use
Suburban Hospital	✓	✓	$	$	Implemented an EHR
Union Hospital of Cecil County	✓	✓	$	$	Demonstrated Meaningful Use
University of Maryland Baltimore Washington Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
University of Maryland Charles Regional Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
University of Maryland Medical Center	✓	✓	$		Participated in Medicare only

Maryland Hospitals N=46	Registration in the EHR Incentive Programs		EHR Incentive Program Activity in 2013		
			Incentive Payment(s) Received		Submission to Medicaid
	Medicare	Medicaid	Medicare	Medicaid	
University of Maryland Medical Center Midtown Campus	✓	✓			Did not participate
University of Maryland Rehabilitation & Orthopedic Institute	✓	✓	$	$	Demonstrated Meaningful Use
University of Maryland Shore Medical Center at Chestertown	✓	✓	$	$	Demonstrated Meaningful Use
University of Maryland Shore Medical Center at Dorchester	✓	✓	$	$	Demonstrated Meaningful Use
University of Maryland Shore Medical Center at Easton	✓	✓	$	$	Demonstrated Meaningful Use
University of Maryland St. Joseph Medical Center	✓				Did not participate
University of Maryland Upper Chesapeake Medical Center	✓	✓	$	$	Demonstrated Meaningful Use
Washington Adventist Hospital	✓	✓	$		Participated in Medicare only
Western Maryland Health System	✓	✓	$		Participated in Medicare only
Total: Maryland Hospitals (%)	**100**	**91**	**91**	**76**	**-**
Both Medicare and Medicaid	**91**		**74**		**-**
Total: Hospitals Nationally[100] (%)	**92**		**86**		**-**

Note: Strikethroughs (-) indicate national comparison data that is unavailable.

[100] CMS, EHR Incentive Programs Data Brief, November 2013. Available at: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/DataBrief_November2013-.pdf.

The following two tables detail hospitals acheivements in meeting both MU Core and Menu Objectives as of 2013. A check mark (✓) indicates those hospitals that attested to the specified objective. Note, four hospitals did not attest to MU in 2013. These hospitals include: Bon Secours Baltimore Health System, Laurel Regional Hospital, University of Maryland St. Joseph Medical Center, and University of Maryland Medical Center Midtown Campus.

Hospital Attainment of Meaningful Use Core Objectives

Maryland Hospitals n=42	**Meaningful Use Core Objectives**												
	CPOE	Drug-Drug, Drug-Allergy Checks	Demographics	CDS	Up-to-Date Problem List	Up-to-Date Medication List	Up-to-Date Medication Allergy List	Vital Signs	Smoking Status	Clinical Quality Measures	Electronic Copy of Health Information	Electronic Copy of Discharge Instructions	Protect Electronic Health Information
	%	Attest	%	Attest	%	%	%	%	%	Attest	%	%	Attest
Anne Arundel Medical Center	100	✓	95	✓	97	100	100	98	96	✓	93	0	✓
Atlantic General Hospital	100	✓	99	✓	99	98	92	89	93	✓	100	0	✓
Calvert Memorial Hospital	59	✓	99	✓	99	100	100	99	98	✓	0	0	✓
Carroll Hospital Center	99	✓	100	✓	94	100	100	97	84	✓	75	100	✓
Doctors Community Hospital	91	✓	100	✓	100	93	99	97	92	✓	100	100	✓
Edward McCready Memorial Hospital	100	✓	93	✓	99	98	99	96	96	✓	0	0	✓
Fort Washington Medical Center	97	✓	99	✓	89	99	99	99	100		0	0	✓
Frederick Memorial Hospital	69	✓	97	✓	100	97	96	81	95	✓	89	100	✓
Garrett County Memorial Hospital	70	✓	100	✓	100	80	100	100	100	✓	0	0	✓
Greater Baltimore Medical Center	88	✓	100	✓	0	92	99	82	98	✓	98	100	✓
Harford Memorial Hospital	70	✓	91	✓	99	99	99	99	100		0	0	✓
Holy Cross Hospital	60	✓	80	✓	80	80	80	80	80	✓	50	50	✓
Howard County General Hospital	100	✓	98	✓	97	100	100	96	85	✓	100	75	✓
Johns Hopkins Bayview Medical Center	99	✓	65	✓	99	98	98	78	83	✓	98	100	✓

Maryland Hospitals n=42	Meaningful Use Core Objectives												
	CPOE	Drug-Drug, Drug-Allergy Checks	Demographics	CDS	Up-to-Date Problem List	Up-to-Date Medication List	Up-to-Date Medication Allergy List	Vital Signs	Smoking Status	Clinical Quality Measures	Electronic Copy of Health Information	Electronic Copy of Discharge Instructions	Protect Electronic Health Information
	%	Attest	%	Attest	%	%	%	%	%	Attest	%	%	Attest
Johns Hopkins Hospital	99	✓	99	✓	99	99	94	84	92	✓	98	0	✓
Medstar Franklin Square Medical Center	92	✓	69	✓	96	90	99	95	87		100	83	✓
Medstar Good Samaritan Hospital	94		90	✓	98	96	99	98	94		0	100	✓
Medstar Harbor Hospital	91	✓	89	✓	95	92	99	93	91	✓	100	100	✓
Medstar Montgomery Medical Center	87	✓	98	✓	89	97	95	89	79	✓	100	100	✓
Medstar Southern Maryland Hospital	97	✓	85	✓	98	100	100	97	92		0	0	✓
Medstar St. Mary's Hospital	94	✓	96	✓	94	97	98	87	89		100	100	✓
Medstar Union Memorial Hospital	30	✓	50		80	80	80	50	50		50	50	✓
Mercy Medical Center	76	✓	99	✓	98	100	100	67	65	✓	100	89	✓
Meritus Medical Center	84	✓	92	✓	100	91	99	82	96	✓	100	100	✓
Northwest Hospital Center	97	✓	97	✓	94	94	97	74	83	✓	100	100	✓
Peninsula Regional Medical Center	87		99	✓	93	99	99	84	82	✓	0	0	✓
Prince Georges Hospital Center	35	✓	80	✓	30	30	30	30	80	✓	60	60	✓
Shady Grove Adventist Hospital	94	✓	99	✓	99	99	100	99	100	✓	100	72	✓
Sinai Hospital	97	✓	98	✓	95	92	98	83	91	✓	100	100	✓
St. Agnes Hospital	35	✓	100	✓	0	0	100	0	100	✓	0	0	✓
Suburban Hospital	61	✓	97	✓	94	97	96	91	95	✓	100	100	✓

Maryland Hospitals n=42	Meaningful Use Core Objectives												
	CPOE	Drug-Drug, Drug-Allergy Checks	Demographics	CDS	Up-to-Date Problem List	Up-to-Date Medication List	Up-to-Date Medication Allergy List	Vital Signs	Smoking Status	Clinical Quality Measures	Electronic Copy of Health Information	Electronic Copy of Discharge Instructions	Protect Electronic Health Information
	%	Attest	%	Attest	%	%	%	%	%	Attest	%	%	Attest
Union Hospital of Cecil County	99	✓	99	✓	100	100	100	85	99	✓	0	0	✓
University of Maryland Baltimore Washington Medical Center	30	✓	50	✓	80	80	80	50	50	✓	50	50	✓
University of Maryland Charles Regional Medical Center	30	✓	50	✓	80	80	80	50	50		50	50	✓
University of Maryland Medical Center	99	✓	96	✓	92	94	99	86	80	✓	0	0	✓
University of Maryland Rehabilitation & Orthopedic Institute	100	✓	100	✓	100	100	100	100	100	✓	100	100	✓
University of Maryland Shore Medical Center at Chestertown	67	✓	99		100	100	100	99	99	✓	100	100	✓
University of Maryland Shore Medical Center at Dorchester	70	✓	99	✓	100	100	100	100	87	✓	100	100	✓
University of Maryland Shore Medical Center at Easton	70	✓	100	✓	100	100	100	85	87	✓	100	100	✓
University of Maryland Upper Chesapeake Medical Center	78	✓	88	✓	60	99	99	99	99		0	0	✓
Washington Adventist Hospital	94	✓	99	✓	99	99	100	99	100	✓	100	72	✓
Western Maryland Health System	63	✓	96	✓	99	99	99	92	99	✓	0	100	✓

Hospital Attainment of Meaningful Use Menu Objectives

Maryland Hospitals n=42	Meaningful Use Menu Objectives									
	Drug-Formulary	Advance Directives	Clinical Lab Test Results	Generate Patient Lists	Patient Specific Education Resources	Medication Reconciliation	Summary of Care Record	Immunization Registries	Lab Results to Public Health Agencies	Syndromic Surveillance Data to Public Health Agencies
	Attest	%	%	Attest	%	%	%	Attest	Attest	Attest
Anne Arundel Medical Center	✓	91	100	✓	97	84	94	✓	N/A	N/A
Atlantic General Hospital	✓	100	96	✓	85	98	0	✓	✓	
Calvert Memorial Hospital	N/A	99	100	N/A	20	90	N/A	N/A	N/A	✓
Carroll Hospital Center	✓	97	100	✓	55	N/A	N/A	✓		
Doctors Community Hospital	✓	0	100	✓	56	N/A	N/A	N/A	✓	✓
Edward McCready Memorial Hospital	✓	94	90	✓	N/A	N/A	N/A	N/A	✓	N/A
Fort Washington Medical Center	N/A	99	99	N/A	N/A	90	83	✓	N/A	N/A
Frederick Memorial Hospital	✓	98	100	✓	N/A	N/A	N/A	✓	N/A	N/A
Garrett County Memorial Hospital	✓	100	100	✓	100	100	0	✓	✓	✓
Greater Baltimore Medical Center	✓	100	99	✓	96	0	0	✓		✓
Harford Memorial Hospital	✓	100	100	✓	73	94	96	✓	✓	✓
Holy Cross Hospital	✓	50	55	✓	10	50	10	✓	✓	✓
Howard County General Hospital	✓	78	100	✓	56	88	86	✓	✓	✓
Johns Hopkins Bayview Medical Center	✓	87	99	✓	N/A	N/A	N/A	N/A	N/A	✓
Johns Hopkins Hospital	✓	97	86	✓	0	0	0	✓	✓	✓
Medstar Franklin Square Medical Center	✓	97	0	N/A	81	97	0	N/A	✓	N/A

Maryland Hospitals n=42	Meaningful Use Menu Objectives									
	Drug-Formulary	Advance Directives	Clinical Lab Test Results	Generate Patient Lists	Patient Specific Education Resources	Medication Reconciliation	Summary of Care Record	Immunization Registries	Lab Results to Public Health Agencies	Syndromic Surveillance Data to Public Health Agencies
	Attest	%	%	Attest	%	%	%	Attest	Attest	Attest
Medstar Good Samaritan Hospital	✓	98	100		82	98	N/A		✓	
Medstar Harbor Hospital		97	99		85	96	N/A		✓	
Medstar Montgomery Medical Center	✓	90	90	✓	96	85	0	✓		
Medstar Southern Maryland Hospital	✓	88	100	✓	0	10	0	N/A	N/A	✓
Medstar St. Mary's Hospital	✓	99	N/A	✓	92	N/A	N/A	✓	N/A	N/A
Medstar Union Memorial Hospital	✓	50	40	✓	N/A	50	N/A	✓	✓	
Mercy Medical Center	✓	83	99	✓	N/A	N/A	N/A	N/A	N/A	✓
Meritus Medical Center	✓	99	98	✓	0	70	0	✓	✓	✓
Northwest Hospital Center	✓	97	98	✓	92	N/A	N/A	✓	✓	✓
Peninsula Regional Medical Center	✓	94	100	✓	66	69	0	N/A		✓
Prince Georges Hospital Center	✓	40	60	✓	30	40	30	✓	N/A	✓
Shady Grove Adventist Hospital	✓	95	83	✓	95	83	0	✓	✓	✓
Sinai Hospital	✓	99	96	✓	88	N/A	N/A	✓	N/A	✓
St. Agnes Hospital	✓	100	100	✓	0	30	0	✓	✓	✓
Suburban Hospital	✓	87	100	✓	59	0	0	✓	✓	✓
Union Hospital of Cecil County	✓	99	100	✓	77	0	0	✓	✓	✓
University of Maryland Baltimore Washington Medical Center	✓	50	40	✓	10	50	50	✓	✓	✓

Maryland Hospitals n=42	Meaningful Use Menu Objectives									
	Drug-Formulary	Advance Directives	Clinical Lab Test Results	Generate Patient Lists	Patient Specific Education Resources	Medication Reconciliation	Summary of Care Record	Immunization Registries	Lab Results to Public Health Agencies	Syndromic Surveillance Data to Public Health Agencies
	Attest	%	%	Attest	%	%	%	Attest	Attest	Attest
University of Maryland Charles Regional Medical Center	✓	50	40	✓	0	0	0	✓		
University of Maryland Medical Center		94	96		98	93	0	✓	N/A	N/A
University of Maryland Rehabilitation & Orthopedic Institute	✓	100	100	✓	100	100	100	✓	✓	✓
University of Maryland Shore Medical Center at Chestertown	✓	100	100	✓	0	80	0	✓	✓	✓
University of Maryland Shore Medical Center at Dorchester	✓	98	100	✓	0	80	0	✓	✓	✓
University of Maryland Shore Medical Center at Easton	✓	98	100	✓	0	80	0	✓	✓	✓
University of Maryland Upper Chesapeake Medical Center	✓	99	100	✓	60	96	95	✓	✓	✓
Washington Adventist Hospital	✓	95	83	✓	95	83	0	✓	✓	✓
Western Maryland Health System	✓	99	99	✓	95	98	99	✓	✓	✓

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